

Fishery Data Series No. 00-6

**Composition and Biomass of the Recreational
Rockfish *Sebastes* Harvest in Southcentral Alaska,
1992-1995**

by

Scott C. Meyer

June 2000

Alaska Department of Fish and Game

Division of Sport Fish



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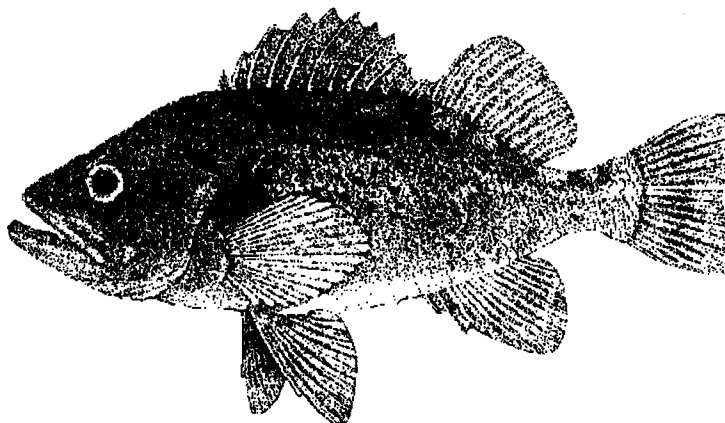
Weights and measures (metric)		General		Mathematics, statistics, fisheries	
centimeter	cm	All commonly accepted abbreviations.	e.g., Mr., Mrs., a.m., p.m., etc.	alternate hypothesis	H_A
deciliter	dL	All commonly accepted professional titles.	e.g., Dr., Ph.D., R.N., etc.	base of natural logarithm	e
gram	g	and	&	catch per unit effort	CPUE
hectare	ha	at	@	coefficient of variation	CV
kilogram	kg	Compass directions:		common test statistics	F, t, χ^2 , etc.
kilometer	km	east	E	confidence interval	C.I.
liter	L	north	N	correlation coefficient	R (multiple)
meter	m	south	S	correlation coefficient	r (simple)
metric ton	mt	west	W	covariance	cov
milliliter	ml	Copyright	©	degree (angular or temperature)	°
millimeter	mm	Corporate suffixes:		degrees of freedom	df
Weights and measures (English)		Company	Co.	divided by	÷ or / (in equations)
cubic feet per second	ft ³ /s	Corporation	Corp.	equals	=
foot	ft	Incorporated	Inc.	expected value	E
gallon	gal	Limited	Ltd.	fork length	FL
inch	in	et alii (and other people)	et al.	greater than	>
mile	mi	et cetera (and so forth)	etc.	greater than or equal to	≥
ounce	oz	exempli gratia (for example)	e.g.,	harvest per unit effort	HPUE
pound	lb	id est (that is)	i.e.,	less than	<
quart	qt	latitude or longitude	lat. or long.	less than or equal to	≤
yard	yd	monetary symbols (U.S.)	\$, ¢	logarithm (natural)	ln
Spell out acre and ton.		months (tables and figures): first three letters	Jan, ..., Dec	logarithm (base 10)	log
Time and temperature		number (before a number)	# (e.g., #10)	logarithm (specify base)	log ₂ , etc.
day	d	pounds (after a number)	# (e.g., 10#)	mid-eye-to-fork	MEF
degrees Celsius	°C	registered trademark	®	minute (angular)	'
degrees Fahrenheit	°F	trademark	™	multiplied by	x
hour (spell out for 24-hour clock)	h	United States (adjective)	U.S.	not significant	NS
minute	min	United States of America (noun)	USA	null hypothesis	H_0
second	s	U.S. state and District of Columbia abbreviations	use two-letter abbreviations (e.g., AK, DC)	percent	%
Spell out year, month, and week.				probability	P
Physics and chemistry				probability of a type I error (rejection of the null hypothesis when true)	α
all atomic symbols				probability of a type II error (acceptance of the null hypothesis when false)	β
alternating current	AC			second (angular)	"
ampere	A			standard deviation	SD
calorie	cal			standard error	SE
direct current	DC			standard length	SL
hertz	Hz			total length	TL
horsepower	hp			variance	Var
hydrogen ion activity	pH				
parts per million	ppm				
parts per thousand	ppt, ‰				
volts	V				
watts	W				

FISHERY DATA SERIES NO. 00-6

**COMPOSITION AND BIOMASS OF THE RECREATIONAL ROCKFISH
Sebastes HARVEST IN SOUTHCENTRAL ALASKA, 1992-1995**

by

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TABLE OF CONTENTS

	Page
LIST OF TABLES.....	iii
LIST OF FIGURES	iv
LIST OF APPENDICES.....	vi
ABSTRACT	1
INTRODUCTION	1
Fishery Description.....	1
Stock Status and Management Issues	3
Recreational Harvest Assessment Program	8
Goals and Objectives	8
METHODS	8
Study Design and Sampling Procedures	8
Study Design.....	8
Data Collection	10
Interview Procedures.....	10
Parameter Estimation.....	11
RESULTS	13
Sampling Summary.....	13
Species Composition.....	13
Age, Length, and Sex Composition	16
Age Composition	16
Length Composition.....	19
Sex Composition.....	25
Geographic Distribution of Effort and Harvest.....	33
Kodiak.....	33
Homer	33
Seward	41
Valdez	41
Average Weight and Sport Harvest Biomass.....	50
DISCUSSION.....	54
Inferences, Accuracy, and Assumptions	54
Longevity	60
Age Composition	61
RECOMMENDATIONS.....	61
ACKNOWLEDGMENTS	62
LITERATURE CITED.....	63
APPENDIX A. SPORT FISH SURVEY HARVEST ESTIMATES.....	67

TABLE OF CONTENTS (Continued)

	Page
APPENDIX B. DETAILED DATA TABLES	69
APPENDIX C. LIST OF DATA AND PROGRAM FILES.....	103

LIST OF TABLES

Table	Page
1. Management assemblages and common and scientific names of rockfishes <i>Sebastes</i> included in this report.	6
2. Numbers of rockfish sampled from the recreational harvest for biological characteristics, by port, 1992-1995.....	14
3. Number of charter and private boat-trip interviews by port and target species, 1992-1995.....	14
4. Assemblage composition (proportion of the number of fish) of the recreational rockfish harvest at selected Southcentral Alaska ports, 1992-1995.....	16
5. Range of ages and lengths of rockfishes sampled from the Southcentral Alaska recreational harvest, 1992-1995.....	17
6. Proportions of the recreational black rockfish harvest from Southcentral Alaska that were female, 1992-1995.....	32
7. Proportions of the recreational yelloweye rockfish harvest from Southcentral Alaska that were female, 1992-1995.....	33
8. Parameters of regression of log weight (kg) on log length (cm) for three rockfish species and management assemblages.....	54
9. Estimated mean round weight (kg), standard error, and sample size of black, dusky, and yelloweye rockfish harvested in recreational fisheries in Southcentral Alaska, 1991-1995.....	55
10. Estimated recreational rockfish harvest biomass (mt) for all species combined, by subarea and year, in Southcentral Alaska during 1991-1995.	57

LIST OF FIGURES

Figure	Page
1. Sampled ports and subareas used in estimation of recreational rockfish harvest statistics, 1992-1995.	2
2. Estimated number of rockfish (all species combined) harvested (1977-1996) and released (1990-1996) in the Southcentral Alaska recreational fishery, by subarea.	4
3. Estimated number of rockfish (all species combined) harvested by charter and non-charter user groups in the North Gulf and Cook Inlet fisheries, 1986-1996.	5
4. Estimated species composition (in proportion of number of fish) of the recreational rockfish harvest landed at Kodiak, Homer, Seward, and Valdez, Alaska, 1992-1995.	15
5. Estimated age composition of the black rockfish sport harvest landed at Kodiak, Homer, Seward, and Valdez, 1992-1995.	18
6. Estimated age composition of the yelloweye rockfish sport harvest landed at Homer, Alaska, in 1992, 1993, and 1994.	20
7. Estimated age composition of the yelloweye rockfish sport harvest landed at Seward, Alaska, during the period 1992-1995.	21
8. Estimated age composition of the yelloweye rockfish sport harvest landed at Valdez, Alaska, during the period 1992-1995.	22
9. Estimated age composition of the dusky rockfish sport harvest landed at Kodiak, Alaska, during the period 1992-1995.	23
10. Estimated age composition of the dusky rockfish sport harvest landed at Homer, Alaska, in 1992, 1993, and 1994.	24
11. Estimated age composition of the dusky rockfish sport harvest landed at Seward, Alaska, in 1993 (upper) and during the entire period 1992-1995 (lower).	25
12. Estimated age composition of the quillback rockfish sport harvest landed at Seward, Alaska, in 1992, 1993, 1995, and during the entire period 1992-1995.	26
13. Estimated age composition of the quillback rockfish sport harvest landed at Valdez, Alaska, in 1992 and 1993.	27
14. Estimated age composition of the copper rockfish sport harvest landed at Valdez, Alaska, in 1993 and during the period 1992-1995.	27
15. Estimated age composition of the sport harvest of canary, China, copper, silvergray, tiger, and yellowtail rockfish landed at Seward, Alaska, 1992-1995.	28
16. Estimated length composition of the black rockfish sport harvest landed at Kodiak, Homer, Seward, and Valdez, Alaska, 1992-1995.	29
17. Estimated length composition of the yelloweye rockfish sport harvest landed at Homer, Seward, and Valdez, Alaska, 1992-1995.	30
18. Estimated length composition of the dusky rockfish sport harvest landed at Kodiak, Homer, and Seward, Alaska, 1992-1995.	31
19. Estimated length composition of the quillback rockfish sport harvest landed at Seward, and Valdez, Alaska, 1992-1995.	32
20. Spatial distribution of recreational effort for bottomfish by charter anglers interviewed in Kodiak, 1992-1995.	34
21. Spatial distribution of recreational effort for bottomfish by private anglers interviewed in Kodiak, 1992-1995.	35
22. Spatial distribution of recreational rockfish harvest (all species) by charter anglers interviewed in Kodiak, 1992-1995.	36
23. Spatial distribution of recreational rockfish harvest (all species) by private anglers interviewed in Kodiak, 1992-1995.	37
24. Spatial distribution of recreational effort for bottomfish by charter and private anglers interviewed at Homer in 1992.	38
25. Spatial distribution of recreational effort for bottomfish by charter anglers interviewed at Homer, 1993-1995.	39
26. Spatial distribution of recreational effort for bottomfish by private anglers interviewed at Homer, 1993-1995.	40

LIST OF FIGURES (Continued)

Figure	Page
27. Spatial distribution of recreational rockfish harvest (all species) by charter anglers interviewed at Homer, 1993-1995.....	42
28. Spatial distribution of recreational effort for bottomfish by Seward Military Resort anglers reported in vessel logbooks, 1992-1995.	43
29. Spatial distribution of the recreational rockfish harvest (all species) by Seward Military Resort anglers reported in vessel logbooks, 1992-1995.	44
30. Spatial distribution of recreational effort for bottomfish by charter anglers interviewed at Seward, 1992-1995.....	45
31. Spatial distribution of recreational effort for bottomfish by private anglers interviewed at Seward, 1992-1995.....	46
32. Spatial distribution of the recreational rockfish harvest (all species) by charter anglers interviewed at Seward, 1993-1995.....	47
33. Spatial distribution of the recreational rockfish harvest (all species) by private anglers interviewed at Seward, 1993-1995.....	48
34. Spatial distribution of recreational effort for bottomfish by charter anglers interviewed at Valdez, 1992-1995.....	49
35. Spatial distribution of recreational effort for bottomfish by private anglers interviewed at Valdez, 1992-1995.....	51
36. Spatial distribution of the recreational rockfish harvest (all species) by charter anglers interviewed at Valdez, 1993-1995.	52
37. Spatial distribution of the recreational rockfish harvest (all species) by private anglers interviewed at Valdez, 1993-1995.	53
38. Observed length-weight data and fitted curves, by species, for rockfish harvested in Southcentral Alaska, 1991-1995.....	56
39. Southcentral Alaska recreational rockfish harvest biomass, by species and subarea, 1992-1995.	58
40. Southcentral Alaska recreational rockfish harvest biomass, by management assemblage and subarea, 1992-1995.....	59

LIST OF APPENDICES

Appendix	Page
A1. Estimated recreational rockfish harvest (number of fish) for all species combined, by subarea and year, in Southcentral Alaska during 1991-1995.	68
B1. Numbers of rockfish sampled for biological characteristics from the recreational harvest at Kodiak, Homer, Seward, and Valdez, 1992-1995.	70
B2. Species composition of rockfishes in the recreational harvest from major Southcentral Alaska ports, 1992-1995 (n = number of fish, p = proportion, SE (p) = standard error of the proportion).	71
B3. Estimated age composition of the black rockfish sport harvest landed at Kodiak, Homer, Seward, and Valdez, 1992-1995.	73
B4. Estimated age composition of the yelloweye rockfish sport harvest landed at Homer, Seward, and Valdez, 1992-1995.	77
B5. Estimated age composition of the dusky rockfish sport harvest landed at Kodiak, Homer, and Seward, 1992-1995.	82
B6. Estimated sex composition of the black rockfish sport harvest landed at Kodiak, Homer, Seward, and Valdez, 1992-1995.	86
B7. Estimated sex composition of the yelloweye rockfish sport harvest landed at Homer, Seward, and Valdez, 1992-1995.	87
B8. Estimated sex composition of the dusky rockfish sport harvest landed at Kodiak, Homer, and Seward, 1992-1995. Sample sizes for missing years were too low to produce reliable estimates.	88
B9. Estimated sex composition of the quillback rockfish sport harvest landed at Seward and Valdez, 1992-1995. Sample sizes for missing years were too low to produce reliable estimates.	89
B10. Effort for bottomfish and harvest of rockfish by user group and ADF&G statistical area for anglers interviewed at Kodiak, 1992-1995.	90
B11. Effort for bottomfish and harvest of rockfish by user group and ADF&G statistical area for anglers interviewed at Homer, 1992-1995.	91
B12. Effort for bottomfish and harvest of rockfish by ADF&G statistical area as recorded in voluntary Seward Military Resort logbooks, 1992-1995. Army and Air Force vessel data are combined in these tables.	93
B13. Effort for bottomfish and harvest of rockfish by user group and ADF&G statistical area for anglers interviewed at Seward, 1992-1995.	94
B14. Effort for bottomfish and harvest of rockfish by user group and ADF&G statistical area for anglers interviewed at Valdez, 1992-1995.	96
B15. Sample size (n) and estimated mean weight and harvest biomass for selected Southcentral Alaska recreational rockfish fisheries, 1991-1995.	98
C1. Names and contents of rockfish biological data files, interview data files, and programs used for analysis of data archived with ADF&G, Division of Sport Fish, Anchorage.	104

ABSTRACT

The recreational fishery for rockfish *Sebastes* was sampled during the summer months of 1992-1995 at four primary ports of landing in Southcentral Alaska, including Kodiak, Homer, Seward, and Valdez. Objectives included estimation of species composition; age, length, and sex composition of the primary species; the geographic distribution of recreational effort and harvest; and the average weight and harvest biomass. Biological parameters were estimated through sampling of landed catch, and the geographic distribution of harvest was estimated using data from interviews with anglers and charter crews.

Length, sex, or age data were collected from over 12,000 rockfish of at least 17 species. Harvest was generally dominated by black *S. melanops*, dusky *S. ciliatus*, and yelloweye *S. ruberrimus* rockfish, with marked differences in relative proportions among ports. Ages were assigned to otoliths of 7,568 fish of 17 species. Maximum assigned ages ranged from 23 to 103 years for 12 species with sample sizes greater than 10 fish. Most harvested black rockfish were 8-20 years old, while the primary age classes were 15-45 for yelloweye rockfish. Dusky rockfish age composition varied by port, with most fish in the range 6-35 years. Sex composition of the black rockfish harvest varied longitudinally, with higher proportions of females (up to 84%) in eastern waters. Males and females made up roughly equal proportions of the yelloweye and quillback *S. maliger* rockfish harvest.

For the most part, the areas fished by charter and private anglers in Kodiak overlapped. At other ports, there were marked differences in the geographic distribution of harvest by various user groups. Average weights ranged among ports and years from 1.7 to 2.6 kg for black rockfish and from 2.5 to 4.6 kg for yelloweye rockfish. Estimates of harvest biomass for the entire area ranged from 94.6 to 115.5 mt during the period 1992-1995. The North Gulf subarea, including fish landed at Seward, accounted for 37% to 51% of the harvest biomass. Improved sampling, additional analyses of existing data, and research leading to the design of marine reserves are recommended.

Key words: Rockfish, *Sebastes*, Alaska, Kodiak, Homer, Seward, Valdez, Gulf of Alaska, Chiniak Bay, Cook Inlet, Resurrection Bay, Prince William Sound, recreational fishery, sport fishery, statistics, estimation, species, age, otolith, longevity, length, sex, weight, user group, effort, harvest, biomass, spatial distribution.

INTRODUCTION

FISHERY DESCRIPTION

The marine waters of Southcentral Alaska support recreational fisheries for a variety of species. Although salmon *Oncorhynchus* and Pacific halibut *Hippoglossus stenolepis* are the primary targets of marine anglers, substantial numbers of rockfish *Sebastes* are also caught in nearshore waters of the Gulf of Alaska from Kodiak Island to Prince William Sound (Figure 1). Rockfish are desired by anglers primarily for their food value. Although rockfish are targeted occasionally, the vast majority of the harvest is taken by anglers targeting halibut or rockfish in combination with other bottomfish. Rockfish, especially black and dusky, are also taken occasionally by anglers targeting chinook salmon *O. tshawytscha* in Cook Inlet and Chiniak Bay near Kodiak, and coho salmon *O. kisutch* in Resurrection Bay near Seward.

These nearshore waters are divided into four major subareas described as follows (Figure 1):

1. Kodiak/Afognak - waters surrounding Kodiak and Afognak islands, including the Barren Islands to the north and waters east of the midline of Shelikof Strait. The primary port of recreational rockfish landings is Kodiak, though harvest can and probably does occur throughout the subarea.
2. Cook Inlet - waters of Cook Inlet north of the Barren Islands and west of Gore Point. The primary port of rockfish landings is Homer.
3. North Gulf - waters between the longitude of Gore Point and the longitude of Cape Puget. The only port is Seward.

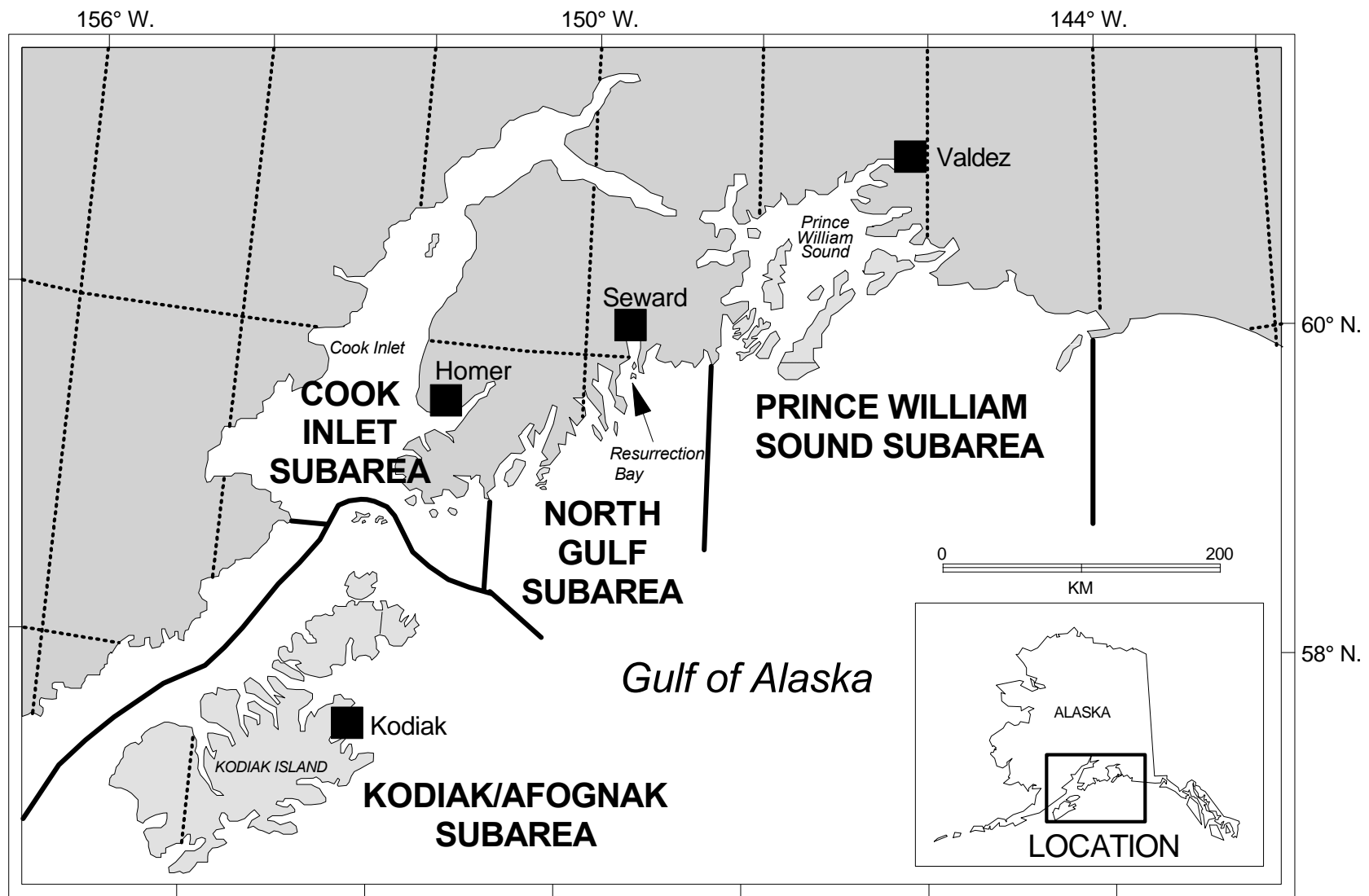


Figure 1.-Sampled ports and subareas used in estimation of recreational rockfish harvest statistics, 1992-1995.

4. Prince William Sound - waters between the longitude of Cape Puget and the longitude of Cape Suckling. Recreational harvest occurs throughout the sound and the primary port of sport landings is Valdez, but landings at Whittier and Cordova have increased in recent years.

Recreational harvest and effort were estimated annually through a postal survey of sport fisheries statewide (Mills 1979-1994, and Howe et al. 1995-1999). Survey questionnaires are mailed to a large random sample of households (47,000 in 1995) containing at least one licensed resident or nonresident angler. Survey estimates are corrected for nonresponse bias through multiple mailings. Rockfish harvest is estimated by area for all species combined. Effort is estimated for all marine species combined, but not separable for rockfish. Explicit estimates of rockfish harvest are provided for the Kodiak/Afognak and Prince William Sound subareas described above, but the estimates for Cook Inlet and the North Gulf are combined into a single Kenai Peninsula Saltwater area. The survey has also provided estimates of rockfish catch (fish kept and released) since 1990 and harvest by guided and unguided anglers in the Kenai Peninsula Saltwater area since 1986.

Estimated harvest of all rockfish species has been highly variable from year to year, but has risen from a little over 20,000 fish in 1977 to about 50,000 fish in recent years (Figure 2). A peak harvest of 69,000 fish occurred in 1988. The North Gulf subarea consistently accounted for the largest share of the harvest (43%-74%). In both the Cook Inlet and North Gulf subareas, the proportion of the harvest taken by chartered anglers has grown since 1986 and is now comparable to the non-charter harvest (Figure 3).

The true removals of rockfish by the sport fishery undoubtedly are substantially higher than indicated by harvest estimates alone. An estimated 18,000 to 42,000 rockfish were caught and released annually in the above four subareas during the period 1990-1996 (Figure 2). Mortality of released rockfish is unknown but probably very high due to decompression injury and trauma. Most rockfishes caught in less than 18 m (about 10 fathoms) of water are able to re-submerge, but mortality is believed to increase to nearly 100% for fish caught at depths in excess of 30 m.

STOCK STATUS AND MANAGEMENT ISSUES

Over 30 species of rockfish inhabit the Gulf of Alaska. At least half that many species have been recorded in the sport harvest (Meyer 1992) but black rockfish *S. melanops*, dusky rockfish *S. ciliatus*, and yelloweye rockfish *S. ruberrimus* are the primary species. The rockfishes of the Gulf of Alaska are categorized, based on preferred habitat and other life history characteristics, into three assemblages: pelagic shelf, demersal shelf, and slope.

The pelagic shelf assemblage (Table 1) consists of species that inhabit waters of the continental shelf and typically exhibit midwater schooling behavior. Black and dusky rockfish are the most common pelagic shelf species taken in the recreational fishery. There are two forms of dusky rockfish: a nearshore, typically smaller 'dark' form, and an offshore, deeper-dwelling 'light' form. These forms are combined in this report. The demersal shelf assemblage consists of species that inhabit the continental shelf and are typically associated closely with bottom habitat. They are usually solitary or occur in small groups. Yelloweye rockfish are the most frequent demersal shelf species in the recreational catch, but quillback *S. maliger*, copper *S. caurinus*, and China *S. nebulosus* rockfish are also commonly taken. Finally, the slope assemblage includes deeper-dwelling species typically found in the deeper, offshore waters of the continental slope.

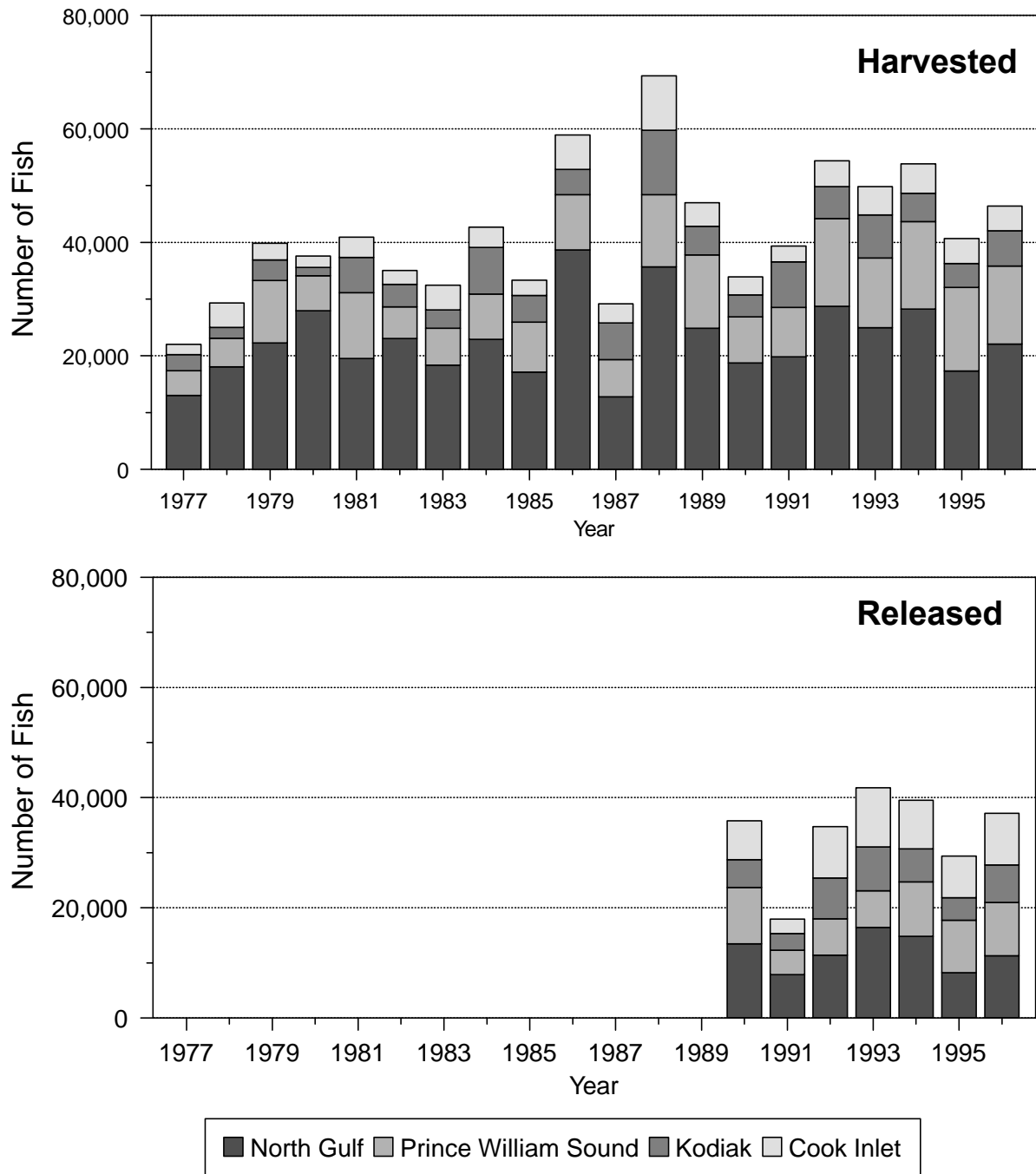
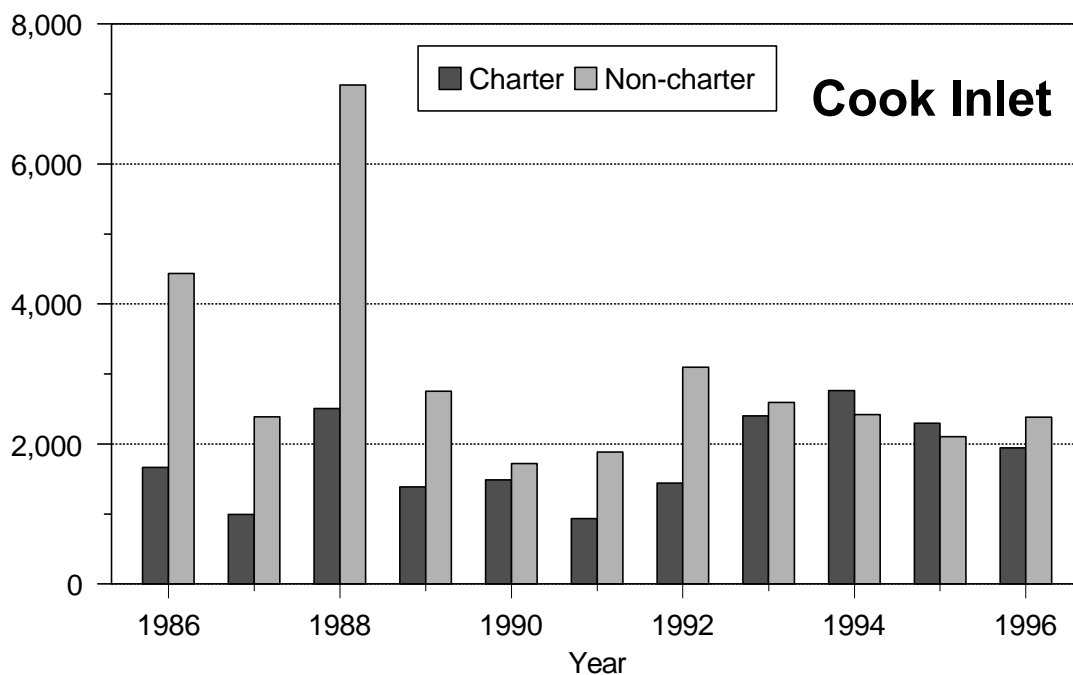
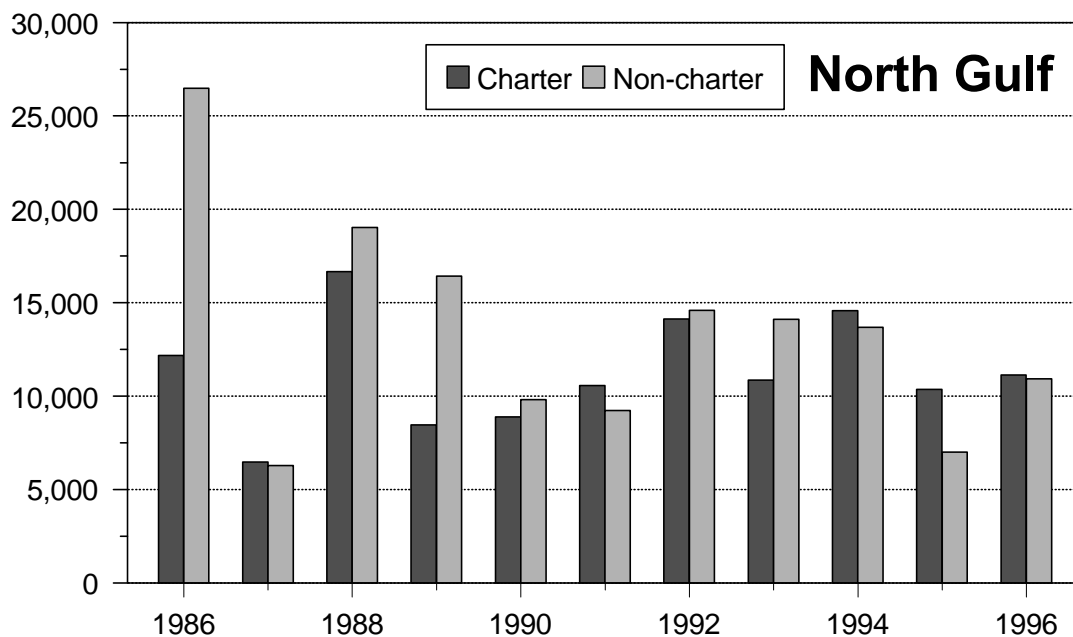


Figure 2.-Estimated number of rockfish (all species combined) harvested (1977-1996) and released (1990-1996) in the Southcentral Alaska recreational fishery, by subarea.

Estimated Number of Rockfish Harvested



From: Mills 1987-1994, Howe et al. 1995-1997.

Figure 3.-Estimated number of rockfish (all species combined) harvested by charter and non-charter user groups in the North Gulf and Cook Inlet fisheries, 1986-1996.

Table 1.-Management assemblages and common and scientific names of rockfishes *Sebastes* included in this report.

Common Name	Scientific Name
Pelagic Shelf Assemblage:	
Black rockfish	<i>S. melanops</i>
Dusky rockfish	<i>S. ciliatus</i>
Widow rockfish	<i>S. entomelas</i>
Yellowtail rockfish	<i>S. flavidus</i>
Demersal Shelf Assemblage:	
Canary rockfish	<i>S. pinniger</i>
China rockfish	<i>S. nebulosus</i>
Copper rockfish	<i>S. caurinus</i>
Quillback rockfish	<i>S. maliger</i>
Rosethorn rockfish	<i>S. helvomaculatus</i>
Tiger rockfish	<i>S. nigrocinctus</i>
Yelloweye rockfish	<i>S. ruberrimus</i>
Slope Assemblage:	
Bocaccio	<i>S. paucispinus</i>
Harlequin rockfish	<i>S. variegatus</i>
Northern rockfish	<i>S. polyspinus</i>
Pacific Ocean perch	<i>S. alutus</i>
Redstripe rockfish	<i>S. proriger</i>
Rougheye rockfish	<i>S. aleutianus</i>
Shortraker rockfish	<i>S. borealis</i>
Silvergray rockfish	<i>S. brevispinus</i>
Splitnose rockfish	<i>S. diploproa</i>

Though slope species are not a major component of the sport harvest anywhere, silvergray rockfish *S. brevispinus* are commonly taken in the North Gulf subarea harvest.

Provision of long-term sustained yield is the primary challenge in managing rockfish fisheries. The problem is particularly difficult for rockfish due to (1) biological factors that increase the risk of overharvest, (2) the lack of stock status information, and (3) the difficulty of assessing stock status.

Biological factors that put rockfish at high risk for overharvest include moderate to extreme longevity, high age at maturity, habitat preferences, and physiology. Maximum age ranges from

about 50 years for most pelagic species to over 100 years for some demersal and slope species (Leaman and Beamish 1984). Corresponding rates of natural mortality are extremely low, indicating low rates of population turnover (Bechtol 1998). Sexual maturity is not reached until 4-23 years of age, depending on species. Many species have a patchy distribution, preferring structure such as pinnacles and reefs that are readily located by the fleet. The fleet is therefore relatively efficient at harvesting, with the likely result that catchability increases as stock size decreases. Finally, rockfish have physoclistous swim bladders and sustain embolism and other decompression injuries when brought to the surface from deep water. This results in high mortality rates of incidental and unwanted catch, and precludes the use of many size or species restrictions.

Stock status is essentially unknown for nearshore species. The time series of available information is neither long enough nor detailed enough to permit estimation of abundance. Commercial and recreational harvest statistics are incomplete, and there have been no systematic surveys or other indices developed to monitor changes in stock status of nearshore stocks. In short, there is no mechanism currently in place to quantitatively assess absolute or relative abundance, or whether current levels of sport or commercial harvest are sustainable. Therefore, there are no specific fishery objectives based on stock status.

Many of the life history traits contribute to the difficulty of assessing the status of rockfish populations. Traditional survey gear, such as trawls, cannot be used in rocky areas. Decompression injury and trauma all but prevent assessment of abundance or movement using conventional tagging methods. Another proven assessment method, line transect sampling using submersibles is relatively expensive and impractical for large areas (O'Connell and Carlisle 1993). Remotely operated vehicles (ROVs) are not effective in high-relief rocky areas inhabited by most nearshore rockfishes (O'Connell and Carlisle 1994). Methods used to determine age are expensive, and long time series of catch-age data needed for age structured assessments are lacking. The aggregative nature of rockfish mentioned previously, combined with recent developments in fishing technology, render catch-per-unit-effort a risky, if not dangerous, index of abundance (Hilborn and Walters 1992; p. 169). It has also been difficult for agencies to secure long-term funding commitments needed to assess rockfish because of the marginal economic value of most rockfish fisheries.

Despite the lack of quantitative abundance estimates or indices, there are data and anecdotal evidence to suggest that some rockfish stocks are depressed. Vincent-Lang (1991) presented evidence to suggest that there has been a reduction in the relative numbers of older black rockfish near Seward. Meyer (1992) showed that bottomfish effort in the Seward-based fishery moved farther from port during the interval 1973-1991. Some long-time participants in the Seward fishery have reported that catch rates (and inferred abundance) of rockfish in Resurrection Bay and the Chiswell Islands is significantly lower than historical levels.

Given the lack of stock status information, risk and consequences of overharvest, and hurdles to stock assessment, the recreational fishery is managed under relatively restrictive regulations compared with other sport rockfish fisheries on the Pacific coast. Bag limits during the period covered in this report were as follows: 10 rockfish of any species per day in the Kodiak/Afognak subarea, where the harvest level is modest and mostly made up of pelagic species, 5 fish per day in the Cook Inlet and North Gulf subareas; and 5 fish per day in Prince William Sound during the peak season (May 1 - September 15) and 10 rockfish per day during the remainder of the year. A

historical review of the sport rockfish regulations for Southcentral Alaska was provided in Vincent-Lang (1995).

RECREATIONAL HARVEST ASSESSMENT PROGRAM

Given the impracticalities and high cost of a detailed stock assessment program for nearshore rockfish, assessment efforts have been directed toward indirect evaluation of stock condition through estimation of harvest characteristics. The earliest work involved tagging and creel surveys in Resurrection Bay in 1972-1973 (ADF&G unpublished data on file in Homer, AK). Basic age and size data were collected in Seward during the period 1988-1990, in Kodiak, Homer, Cordova, and Valdez in 1989 (Roth 1990), and in Valdez in 1990 (Meyer 1992). In 1991 the Division of Sport Fish launched a more controlled and rigorous recreational harvest assessment program for halibut, rockfish, and lingcod throughout Southcentral Alaska with sampling at Homer, Deep Creek, Seward, Whittier, and Valdez. Sampling was discontinued at Whittier in favor of Kodiak in 1992. This ongoing program involves random sampling of harvested rockfish for length, age, sex, and maturity. It also involves random sampling of vessels for interviews to collect fishery performance information such as number of anglers, bottomfish catch and harvest by species, target species, and area fished. It is hoped that this information, combined with similar data from commercial fisheries, will provide insight into gross relative changes in stock condition.

GOALS AND OBJECTIVES

The goal of this ongoing project is to provide the information necessary to manage the recreational rockfish fishery for sustained yield. This requires, at a minimum, a cost-effective program for obtaining information on the sport fishery and characteristics of the harvest. Therefore, data were collected at the primary ports of rockfish landings in each of four subareas in the northern Gulf of Alaska. The first three objectives were to estimate, for each port and year from 1992-1995:

1. The species composition of the recreational rockfish harvest,
2. The age, length, and sex composition of the primary rockfish species in the harvest,
3. The geographic distribution of recreational effort for rockfish and other bottomfish, and the geographic distribution of rockfish harvest.

The final objective was to estimate, for each subarea and year from 1991-1995:

4. The average weight of primary species and the total sport harvest biomass.

METHODS

STUDY DESIGN AND SAMPLING PROCEDURES

Study Design

Sampling was conducted in the ports of Kodiak, Homer, Seward, and Valdez (Figure 1). These were the primary ports of sport rockfish landings in southcentral Alaska and were chosen to represent the harvest in the corresponding Kodiak/Afognak, Cook Inlet, North Gulf, and Prince William Sound subareas defined above. This area stretches about 675 km (420 statute miles) from east to west.

A technician was stationed in each port generally during the period late May through early September to include the majority of the recreational fishing season. Actual dates varied by port and year as follows:

Year	Kodiak	Homer	Seward	Valdez
1992	6/04 - 9/07	5/22 - 9/11	5/17 - 9/13	6/01 - 9/07
1993	5/26 - 9/08	5/26 - 9/12	5/27 - 9/12	5/27 - 9/08
1994	5/26 - 9/12	5/26 - 9/13	5/26 - 9/10	5/28 - 9/05
1995	5/22 - 9/12	5/16 - 9/08	5/25 - 9/08	5/25 - 9/03

There were two aspects to data collection: (1) biological sampling for species, age, size, and sex (objectives 1, 2, and 4); and (2) angler interviews to gather data on the geographic distribution of effort and harvest (objective 3). The sampling design was improved each year to minimize potential bias. In 1992, fish sampling and angler interviews were conducted simultaneously 5 days per week including all weekends and holidays. The work shift varied by port but generally fell in the period 1400-2300 hours. This design posed some risk of bias from over-sampling of the private harvest component, which tended to be concentrated on weekends, and increased probability of interviewing successful anglers. Beginning in 1993 fish sampling and interviews were conducted on separate days at all ports except Kodiak, where simultaneous sampling was manageable. Fish were sampled on 3 randomly chosen days per week and anglers were interviewed 2 days per week. This resulted in fewer days of more intense sampling for each data type. The number of days of biological and interview sampling therefore varied by port and year:

Year	Kodiak		Homer		Seward		Valdez	
	Biological Data	Interview Data	Biological Data	Interview Data	Biological Data	Interview Data	Biological Data	Interview Data
1992	70	70	82	82	86	86	71	71
1993	79	79	51	35	52	34	56	33
1994	77	77	49	34	43	36	40	35
1995	78	78	51	33	47	30	41	29

All weekends and holidays were again worked at all ports. Interviews at Valdez and Seward were conducted during the period 1600-2200 hours. The Homer harbor was divided into five areas, and interviews were conducted for 1 hour in each area during the period 1500-2000 hours. The area order was selected at random each day.

In 1994 and 1995, 5 workdays were selected at random each week such that weekends and weekdays were sampled proportionately. This was done because private anglers made up a higher proportion of the harvest on weekends than weekdays. Separation of fish sampling and interviews continued at all ports except Kodiak. The interview periods were changed to 1600-2300 hours at Valdez and to 1400-2000 hours at Homer. Interviews at Seward were conducted for 3.5 hours in each of two areas starting at 1500 hours, with the first area chosen at random.

Sampling was conducted in the harbors, at boat ramps, and at the military recreation facilities in Kodiak and Seward. The U.S. Coast Guard boat ramp and fish cleaning facility was not sampled in 1992 but was included all other years. Large plastic trash cans were labeled and placed at

cleaning tables and boat ramps to collect carcasses when the technician was away or busy. Technicians attempted to distribute sampling effort among all locations at each port and throughout the shift. For example, the Kodiak technician rotated between the two harbors downtown and the Coast Guard Base such that a different starting point was chosen each day and all sites were visited 2-3 times per day. At all ports except Seward, technicians attempted to sample all rockfish they encountered. At Seward, where the magnitude of harvest was greater, fish were sampled systematically (e.g., every fifth fish regardless of species) to help ensure that the sample size was proportional to harvest over time. The systematic rate was varied within a season in response to changes in harvest levels.

Some charter operations cleaned all or a portion of their harvest before returning to port. Arrangements were made with the charter operator to retain carcasses for sampling whenever possible. With few exceptions, data were not recorded from any portion of a vessel's rockfish harvest unless all fish (or a random sample) were available. Occasionally data were obtained from uncommon species that were not part of the systematic sample, but these data were then excluded from estimates of species composition.

Data Collection

Species were identified using Kramer and O'Connell (1995) or Hart (1973). The maximum total length (Anderson and Gutreuter 1983) was recorded to the nearest millimeter. All species were weighed on an opportunistic basis. Weights were recorded to the nearest 0.25 kg in 1992 and 1993, and to the nearest 0.10 g in 1994 and 1995. Gonad condition (Westrheim 1975) was recorded but not analyzed for this report. User group (private, charter, military) was recorded whenever possible, and the ADF&G groundfish statistical area (stat area) of capture was recorded whenever possible in 1993-1995 only.

Otoliths were removed, hand cleaned, and stored dry in coin envelopes. Age was estimated using the break-and-burn method (Chilton and Beamish 1982). Four different people aged rockfish otoliths over the 4-year period covered in this report. One ager assigned ages to some species collected in 1992 and 1993, one assigned ages in 1992 only, one assigned ages in 1993 only, and the fourth aged all otoliths collected in 1994 and 1995. Agers examined reference sets before assigning ages to each year's sample to ensure maximum consistency between years. In addition, sets of 30 black rockfish and 30 yelloweye rockfish otoliths collected in 1993 were exchanged with the ADF&G aging lab in Juneau to assess consistency between programs. The comparison indicated that yelloweye rockfish ages assigned by the two labs were similar, but that the agers in this project (1992 and 1993) tended to age black rockfish 1 year higher than the Juneau agers. Given the application of the age data in this report, this difference was assumed to be acceptable.

Interview Procedures

Returning boats were contacted for interviews regardless of success. All anglers that targeted bottomfish (halibut, rockfish, or lingcod) or harvested bottomfish while targeting other species were interviewed. Skippers of charter and private boats were interviewed whenever possible to obtain accurate reporting of stat areas. Anglers fishing on military recreation boats at Seward were not interviewed because the Army and Air Force recreation camps voluntarily provided harvest census logbooks with comparable information.

The types of interview data collected varied by port and from year to year. The date, user group (charter, private), target species, number of anglers, and location fished were recorded each year

at all ports. The target species was recorded exactly as reported by the anglers in 1992, but in subsequent years was categorized. Charter captains and deck hands were included in the angler count if they fished. For location fished, ADF&G statistical areas were recorded at all ports each year except at Homer in 1992. That year, Lower Cook Inlet waters were simply divided into four large zones. The total number of rockfish kept by the vessel was recorded at Kodiak only in 1992, and at all ports thereafter. The number of rockfish released was recorded at Kodiak in 1992 and at all ports in 1994 and 1995. Beginning in 1995, rockfish harvest and release was recorded by assemblage (pelagic versus other) at all ports. Though not reported here, the gear (jig, bait, or troll) was also recorded in 1993.

PARAMETER ESTIMATION

Species, age, length, and sex composition were expressed as the proportion of the harvest in each category. Species composition, for example, was estimated for each port and year as

$$\hat{p}_i = \frac{n_i}{n}, \quad (1)$$

where

\hat{p}_i = the estimated proportion of fish of species i in the harvest,

n_i = the number of fish of species i in the sample, and

n = the total number of fish sampled.

The variance of each proportion was estimated as:

$$\text{Var}(\hat{p}_i) = \frac{\hat{p}_i(1 - \hat{p}_i)}{n - 1}. \quad (2)$$

The finite population correction to the estimated variance was ignored because sample size was small relative to the number of fish harvested (Cochran 1977, p. 52).

Chi-square contingency tables were used to test for differences in composition (species, age, sex) among months and user groups. Adjacent age groups with few observations were pooled to avoid bias (Zar 1984; p. 70). The Cochran-Mantel-Haenszel test (SAS 1990; p. 859) was used to examine longitudinal trends in sex composition of black rockfish.

The proportion of effort (angler-days) and harvest (number of fish) in each statistical area were also estimated using equations 1 and 2, substituting statistical area for species. Effort for rockfish was difficult to define, since anglers fishing for other species are often effectively targeting rockfish. To simplify, an angler-day was tallied for each statistical area in which an angler spent any portion of the day targeting rockfish, rockfish in conjunction with other bottomfish, or the more general category "bottomfish." The proportions of harvest by statistical area were calculated regardless of the target species indicated. When a vessel fished in multiple statistical areas but could not separate their reported harvest by statistical area, the harvest of that vessel was apportioned to individual statistical areas similarly to the total fleet catch that was separable.

Many sampled fish were filleted or gutted, or could not otherwise be weighed. Mean round weights for each species were therefore estimated as the mean of predicted weights (Nielsen and Schoch 1980). Weights were predicted using the allometric growth model:

$$\hat{W} = aL^b, \quad (3)$$

where W is the weight in kilograms, and L is the observed length in centimeters. Parameter a is the antilog of the intercept and parameter b is the slope of a least-squares regression of $\log W$ on $\log L$. Length-weight parameters were estimated for each assemblage and each species using length and weight data from 1991-1995.

The general linear model (GLM procedure, SAS 1990) was used to evaluate differences in regression parameters among ports, sexes, and years for species with sufficient sample sizes. Differences among these variables were statistically significant for several species but the differences were not biologically meaningful. For example, black rockfish harvest biomass was estimated using a regression model that considered ports, sexes, and years, and using a regression model that pooled these variables. The average difference between estimates averaged only 0.38%. The same comparison for yelloweye rockfish indicated an average difference of only 0.40%.

Species-specific regression parameters were used to estimate mean weight when the sample size for a species exceeded 100, otherwise the assemblage regression parameters were used. The minimum sample size of 100 was somewhat arbitrary, but this approach was felt to be more conservative because some of the species-specific regressions were based on small samples that may not have been representative. A comparison of this approach versus using species-specific regression parameters for Valdez in 1991 indicated only a 0.3% difference in the point estimate of harvest biomass, and only a 0.05% difference in the standard error. Variances of the mean predicted weights were estimated using standard normal procedures (Thompson 1992; p. 15), but should be considered minimum estimates because variation inherent in the length-weight relationship was not incorporated.

Harvest biomass for each species in any given subarea and year (B_i) was estimated by multiplying the harvest estimate by the relative species proportion and estimated mean weight:

$$\hat{B}_i = \hat{H} \bar{w}_i \hat{p}_i, \quad (4)$$

where:

\hat{H} = the estimated harvest (number of fish) of all rockfish species in a subarea,

\bar{w}_i = the estimated mean round weight of species i , and

\hat{p}_i = the estimated proportion of species i in the harvest (from equation 1).

Variance of the biomass estimate was estimated using (Goodman 1960):

$$v(\hat{B}_i) = \hat{H}^2 v(\bar{w}_i \hat{p}_i) + v(\hat{H})(\bar{w}_i \hat{p}_i)^2 - v(\hat{H})v(\bar{w}_i \hat{p}_i), \quad (5)$$

where:

$$v(\bar{w}_i \hat{p}_i) = \bar{w}_i^2 v(\hat{p}_i) + v(\bar{w}_i) \hat{p}_i^2 - v(\bar{w}_i)v(\hat{p}_i). \quad (6)$$

Rockfish harvests (number of fish) were estimated using the statewide Sport Fish Harvest Survey database (Appendix A1). Variances of the harvest were estimated using the bootstrap technique (Efron 1982). Estimates and variances were summed across species to obtain total rockfish harvest biomass for each subarea and year.

RESULTS

SAMPLING SUMMARY

Biological data (species, age, length, sex, etc.) were collected from 12,609 rockfish of at least 17 species sampled from all ports during the period 1992-1995 (Table 2, Appendix B1). Seward provided the largest sample sizes each year. As indicated in the Methods section of this report, adjustments to the sampling design resulted in variable levels of sampling intensity among ports and years. Rockfish sample sizes at Valdez and Homer declined markedly from 1993 to 1994 despite similar sampling designs and levels of sampling effort.

There was also significant variation among ports and years in the number of vessels interviewed (Table 3). The variation was probably due to changes in study design, changes in fishing effort, logistics of sampling at each port, and interviewer skill and aggressiveness. The number of interviews with any bottomfish as the target species was only slightly lower than the total number of interviews. A total of 6,253 vessel-trip interviews (targeting any species) were conducted, for an average of 1,563 interviews per year. The average number of interviews per year varied by port, with 384 at Kodiak, 477 at Homer, 408 at Seward, and 295 at Valdez. The number of interviews obtained in any one port and year ranged from 116 at Valdez in 1992 to 757 at Homer in 1992.

SPECIES COMPOSITION

The sport harvest was generally dominated by black, dusky, and yelloweye rockfish, but there was some variation by port (Figure 4, Appendix B2). Black and dusky rockfish accounted for 96%-99% of the harvest landed at Kodiak across all years. Black rockfish made up 71%-82%, dusky rockfish made up 17%-28%, and the remainder was composed of tiger, yelloweye, and yellowtail. Small numbers of other demersal species were reported landed at Kodiak but none were encountered in sampling and they likely made up a very small portion of the harvest. Black, dusky, and yelloweye rockfish accounted for 95%-98% of the sport harvest landed at Homer. Black rockfish made up 29%-42%, dusky rockfish made up 19%-36%, and yelloweye rockfish made up 30%-44%. Harvest at Seward was dominated by black rockfish (72%-78%) and yelloweye rockfish (14%-16%). Together these two species accounted for 87%-92% of the harvest. Dusky, quillback, and silvergray rockfish were the next most common species, but combined they never accounted for more than 10% of the harvest. Finally, the Valdez harvest was dominated by black rockfish (19%-41%) and yelloweye rockfish (39%-62%). Quillback rockfish was the next most common species (5%-12%), with various demersal and slope species making up the remainder.

Some broad geographic patterns in species assemblage composition were evident (Table 4). Pelagic species were more prevalent in fisheries operating in open Gulf of Alaska coastal waters (Kodiak to Seward) than in protected inside waters of Prince William Sound. Dusky rockfish in particular were more prevalent in the harvest from western waters (Kodiak and Homer). Demersal species (especially species other than yelloweye) were more common in the harvest from the eastern half of the area, namely Seward and Valdez. Slope species (primarily silvergray rockfish) made up a small part of the harvest everywhere, but were again more common in eastern fisheries (Seward and Valdez).

Table 2.-Numbers of rockfish sampled from the recreational harvest for biological characteristics, by port, 1992-1995.

Year	Kodiak	Homer	Seward	Valdez	Total
1992	414	860	2,475	974	4,723
1993	1,053	534	1,272	846	3,705
1994	508	403	996	264	2,171
<u>1995</u>	<u>431</u>	<u>158</u>	<u>1,235</u>	<u>186</u>	<u>2,010</u>
Totals	2,406	3,705	2,171	2,010	12,609

Species composition was estimated with high precision most years (Appendix B2). The highest level of precision was achieved at Seward, where sample sizes were generally the largest. For example, the standard error of black rockfish species composition ranged from 0.009 to 0.015. This corresponds to a relative precision (with 95% confidence) of about $\pm 2\%$ - 3% . For Kodiak, the relative precision of black and dusky rockfish species composition was similar, and never exceeded $\pm 4.5\%$. The precision of species composition estimates was lowest at Homer and Valdez, but the worst estimates were still within $\pm 8\%$.

Table 3.-Number of charter and private boat-trip interviews by port and target species, 1992-1995.

Target Species	Year	Kodiak		Homer		Seward ^a		Valdez	
		Charter	Private	Charter	Private	Charter	Private	Charter	Private
All:	1992	30	163	453	304	124	149	78	38
	1993	75	355	154	160	78	233	190	158
	1994	116	380	291	220	121	285	210	198
	1995	93	324	182	145	183	457	165	141
Bottomfish:	1992	30	158	453	304	124	149	78	38
	1993	75	354	154	160	78	233	189	156
	1994	109	374	288	208	121	285	209	196
	1995	91	324	176	130	149	167	165	141

^a Data for Seward do not include logbook information from Seward Military Resort vessels.

Proportion of Harvest

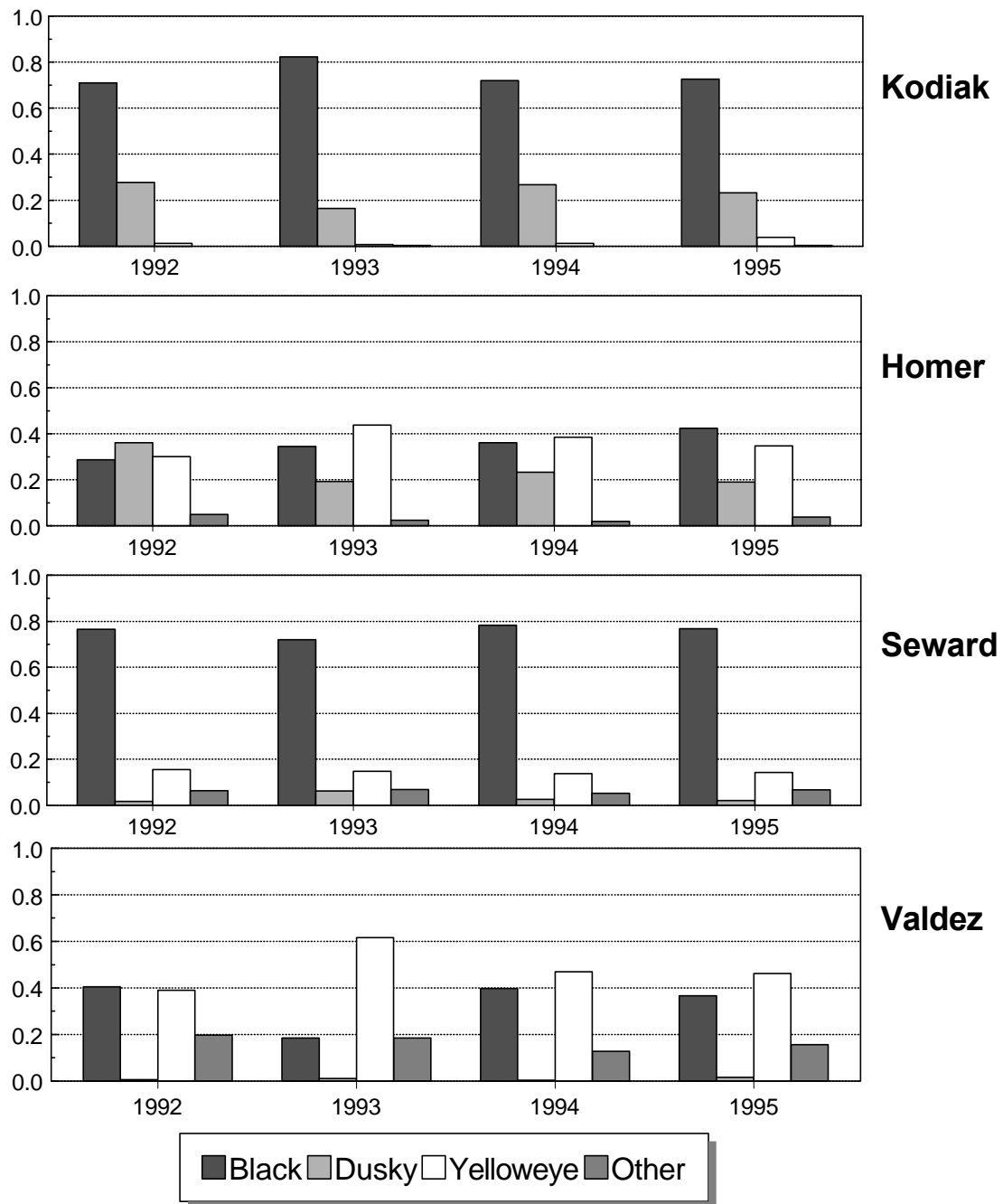


Figure 4.-Estimated species composition (in proportion of number of fish) of the recreational rockfish harvest landed at Kodiak, Homer, Seward, and Valdez, Alaska, 1992-1995.

Table 4.-Assemblage composition (proportion of the number of fish) of the recreational rockfish harvest at selected Southcentral Alaska ports, 1992-1995.

Port and Assemblage	Year			
	1992	1993	1994	1995
Kodiak				
Pelagic	0.988	0.990	0.988	0.958
Demersal	0.012	0.010	0.012	0.042
Slope	0.000	0.000	0.000	0.000
Homer				
Pelagic	0.651	0.537	0.596	0.627
Demersal	0.343	0.455	0.402	0.367
Slope	0.006	0.008	0.002	0.006
Seward				
Pelagic	0.787	0.787	0.809	0.794
Demersal	0.197	0.198	0.179	0.192
Slope	0.016	0.015	0.012	0.014
Valdez				
Pelagic	0.411	0.197	0.401	0.382
Demersal	0.574	0.791	0.572	0.618
Slope	0.015	0.012	0.027	0.000

AGE, LENGTH, AND SEX COMPOSITION

Age, length, and sex composition were estimated for the primary species harvested at each port each year. Estimates were desired within 10% of the true values with at least 95% confidence. Sample sizes were sometimes inadequate, even for the primary species, to reach these targets. Since much of this recreational harvest data is new, and in some cases represents the only data available for these species in this area, estimates with relative precision as low as $\pm 15\%$ with at least 95% confidence are presented.

Age Composition

Ages were assigned to 7,568 individual fish of 17 species and four fish for which only the assemblage was determined (Table 5). The youngest fish encountered were several 2-year-old black rockfish harvested in Kodiak in 1992. The oldest fish was a 103-year-old yelloweye rockfish landed at Seward in 1994. Species with individuals whose assigned ages exceeded

Table 5.-Range of ages and lengths of rockfishes sampled from the Southcentral Alaska recreational harvest, 1992-1995.

Species	Age (years)		No. Aged	Length (cm)		No. Measured
	Min.	Max.		Min.	Max.	
Black	2	50	3,687	24.6	66.6	5,738
Bocaccio	8	46	13	32.0	90.0	13
Canary	7	23	101	32.5	58.5	99
China	11	56	99	27.6	41.5	96
Copper	5	50	161	22.9	49.2	152
Dusky	5	67	968	20.9	57.9	1,100
Northern	13	13	1	25.1	25.1	1
Quillback	8	74	392	30.5	56.1	382
Rosethorn	21	71	4	30.5	45.5	4
Rougheye	10	30	16	32.5	61.0	16
Redstripe	11	33	10	32.1	46.4	10
Shortraker	10	20	4	39.0	44.0	3
Silvergray	7	52	133	24.3	70.0	129
Tiger	13	84	64	32.6	48.4	62
Unspecified slope	7	7	1	27.4	27.4	1
Unspecified demersal	11	12	3	44.2	46.0	3
Widow	12	13	2	50.5	51.0	2
Yelloweye	5	103	1,864	21.3	88.9	2,382
Yellowtail	8	42	49	36.0	55.5	49
			7,572			10,242

50 years of age included China, dusky, quillback, rosethorn, silvergray, tiger, and yelloweye rockfish. Notably old fish included two dusky rockfish exceeding 60 years, an 84-year-old tiger rockfish, and a 74-year-old quillback rockfish.

Sample sizes were adequate to estimate black rockfish age composition to within the desired limits of precision for nearly all ports and years (Appendix B3). Fish in the range 8-20 years dominated the black rockfish harvest at all ports (Figure 5). The frequency of ages in the range 15-20 years declined abruptly at all ports, yet low numbers of fish were present in the harvest out to about age 35 or 40. Harvest at all ports but Seward had a pronounced mode at around age 15. The modal age of the Seward harvest was between 10 and 13 years. A secondary mode was consistently evident at about ages 8-11 at Kodiak. Six-year-old fish were also relatively abundant in the 1992 harvest at Homer and the 1995 harvest at Kodiak.

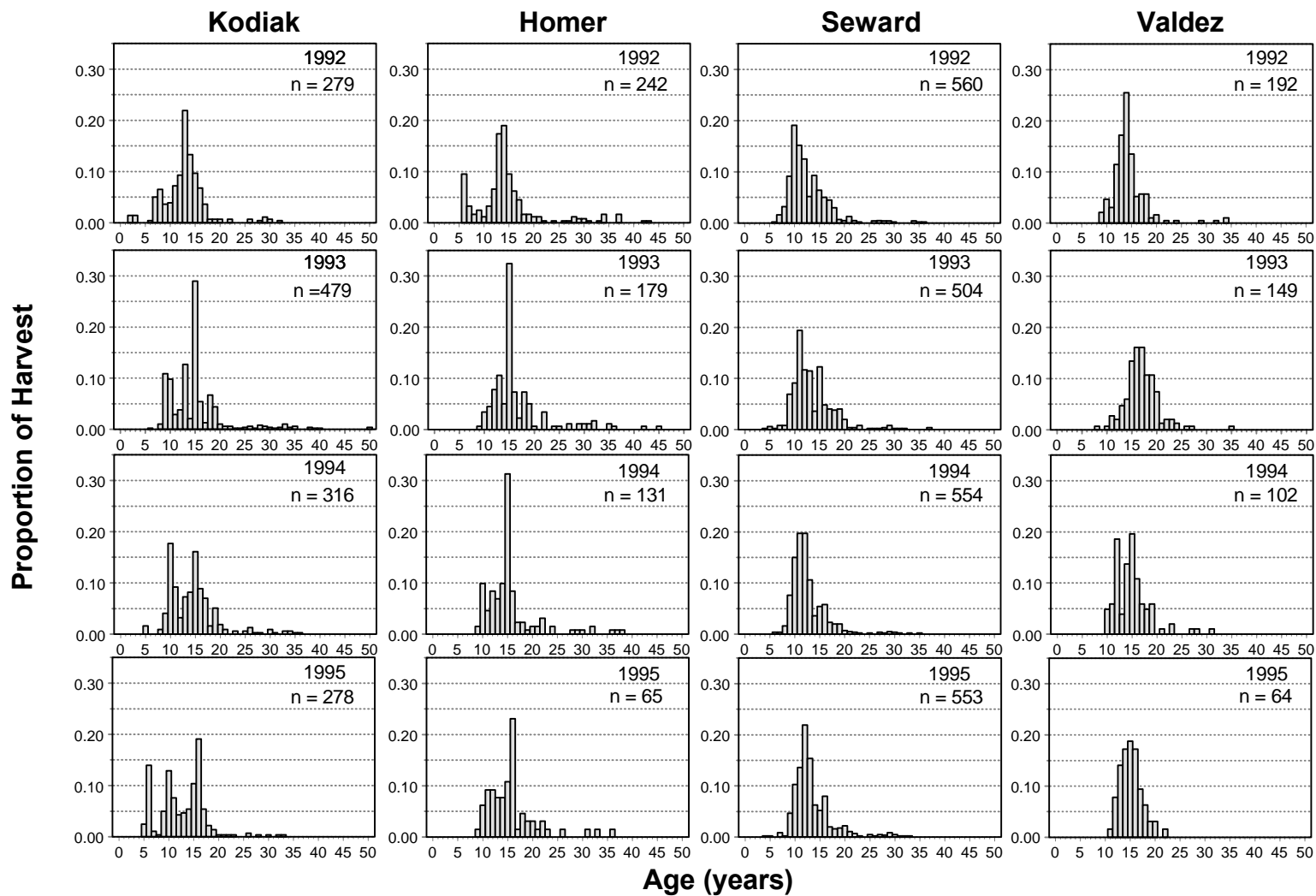


Figure 5.-Estimated age composition of the black rockfish sport harvest landed at Kodiak, Homer, Seward, and Valdez, 1992-1995.

Relatively strong modes of black rockfish were present in succeeding years at most ports. Strong individual year classes, however, did not consistently advance in echelon in successive years. In particular, strong cohorts from Kodiak and Homer did not progress one year between 1993 and 1994, probably due to differences in aging methods. If the ages assigned in 1994 and 1995 ages are assumed to be correct, then the 1979 year-class was particularly strong, especially in waters to the west (Homer and Kodiak). The inter-annual differences in age composition at Valdez were probably due to more than just aging error because the shapes and modes of distributions were not consistent from year to year.

Although yelloweye rockfish was the second most common species harvested regionwide, sample sizes were not adequate for Homer in 1995 ($n = 45$) or for Kodiak any year (maximum $n = 12$) for estimation of age composition with acceptable precision. The bulk of the yelloweye rockfish harvest was between the ages of 15 and 45, but there were older fish scattered up to 103 years (Figures 6-8, Appendix B4). A strong mode was evident between the ages of 25 and 30 and a relatively smaller mode was evident in most samples near 35 years. Another relatively strong mode was evident in the Valdez harvest between the ages of 15 and 20 years (Figure 8). As with black rockfish, modal year classes did not advance in echelon due to even greater imprecision in assigned ages.

Age composition of the dusky rockfish harvest was estimated for all years at Kodiak but only selected years at Homer and Seward because of small sample sizes (Appendix B5). Most harvested dusky rockfish were in the ranges of 7-35 years in Kodiak (Figure 9), 6-25 years in Homer (Figure 10), and 10-30 years in Seward (Figure 11). Estimates of age composition varied widely from port to port and from year to year at Kodiak and Homer. A strong mode was evident in the range of 6-9 years at Kodiak and Homer in 1992, 1994, and 1995, but absent from all ports in 1993.

Age composition was estimated for the harvest of some other species in years when sample sizes were adequate to achieve the desired precision. If a single year's sample was inadequate, data were pooled over all years to obtain a general picture of the primary age classes harvested. The quillback rockfish harvest at Seward and Valdez was made up mostly of fish in the 15-55 year-old range (Figures 12 and 13). Periods of relatively weak year-classes were evident about 30 and 40 years ago. Copper rockfish landed at Valdez were primarily 10-20 years old, with a few scattered fish up to around age 50 (Figure 14). Of the less commonly harvested species at Seward, tiger rockfish were the oldest with individuals exceeding 80 years. Most of the other species harvested were 10-30 years old (Figure 15).

Length Composition

Length measurements were obtained from 10,242 fish of 17 species and four fish of unknown identity (Table 5). The smallest fish measured was a 20.9 cm (5-year-old) dusky rockfish harvested in Seward in 1993, the largest a 90.0 cm (46-year-old) bocaccio rockfish landed in Seward in 1994.

Black rockfish ranged in length from 24.2 to 66.6 cm. For the most part, lengths of harvested fish were between 40 and 55 cm, but significant numbers of small fish were landed at Homer in 1992 and Kodiak in 1995 (Figure 16). Black rockfish landed at Valdez were on average larger than fish landed at other ports, which was consistent with the relative lack of young fish observed in estimates of age composition (Figure 5).

Proportion of Harvest

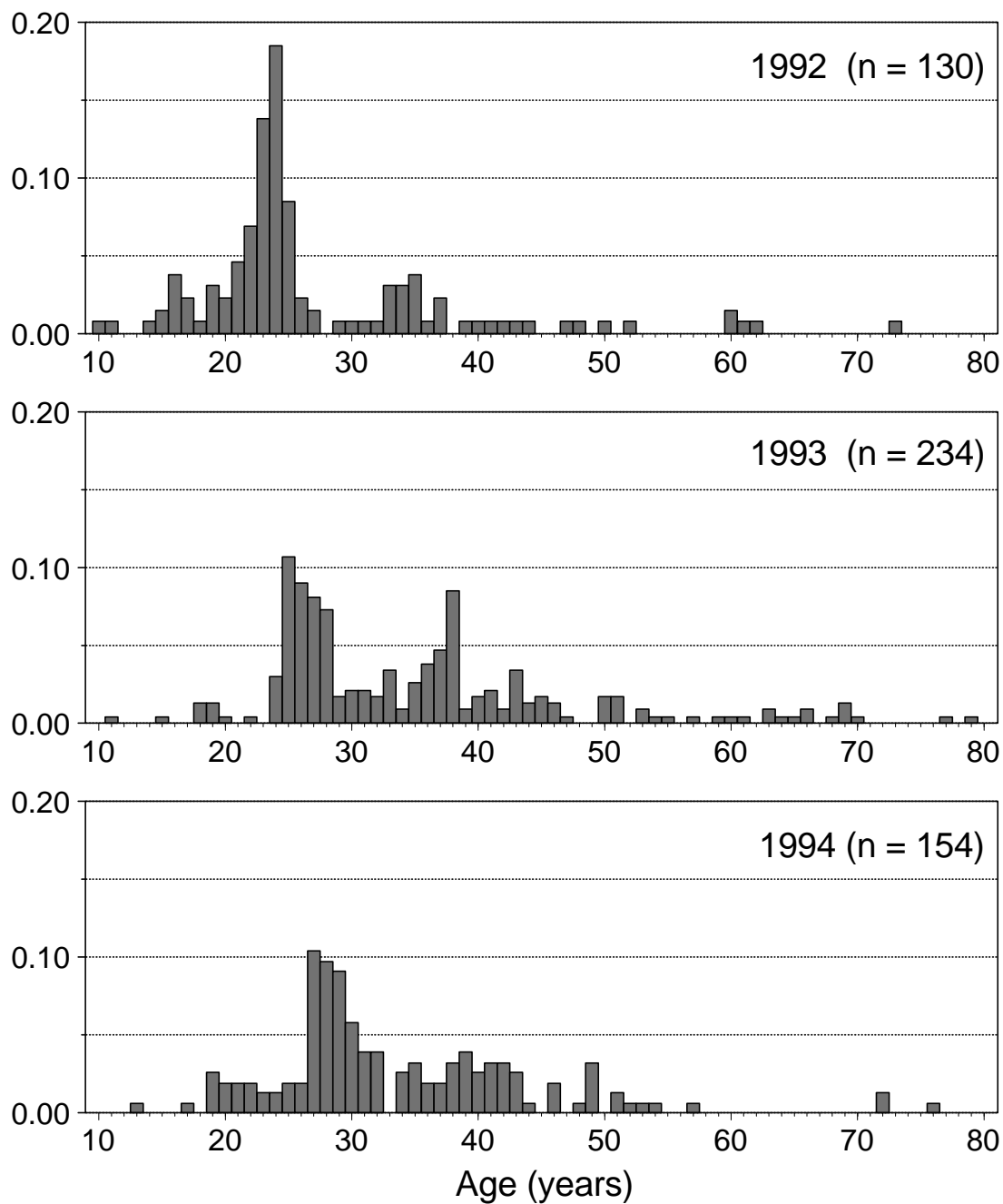


Figure 6.-Estimated age composition of the yelloweye rockfish sport harvest landed at Homer, Alaska, in 1992, 1993, and 1994.

Proportion of Harvest

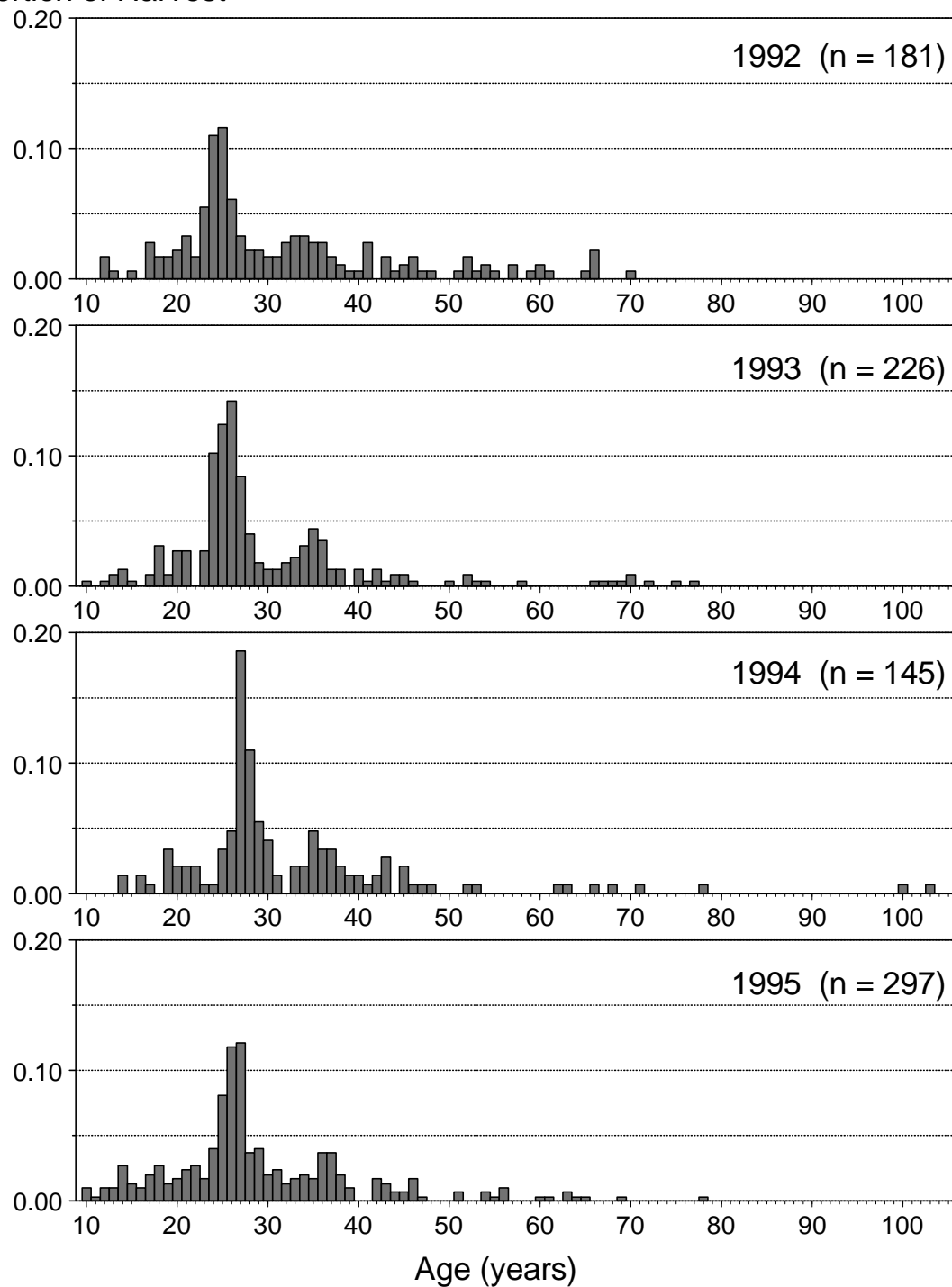


Figure 7.-Estimated age composition of the yelloweye rockfish sport harvest landed at Seward, Alaska, during the period 1992-1995.

Proportion of Harvest

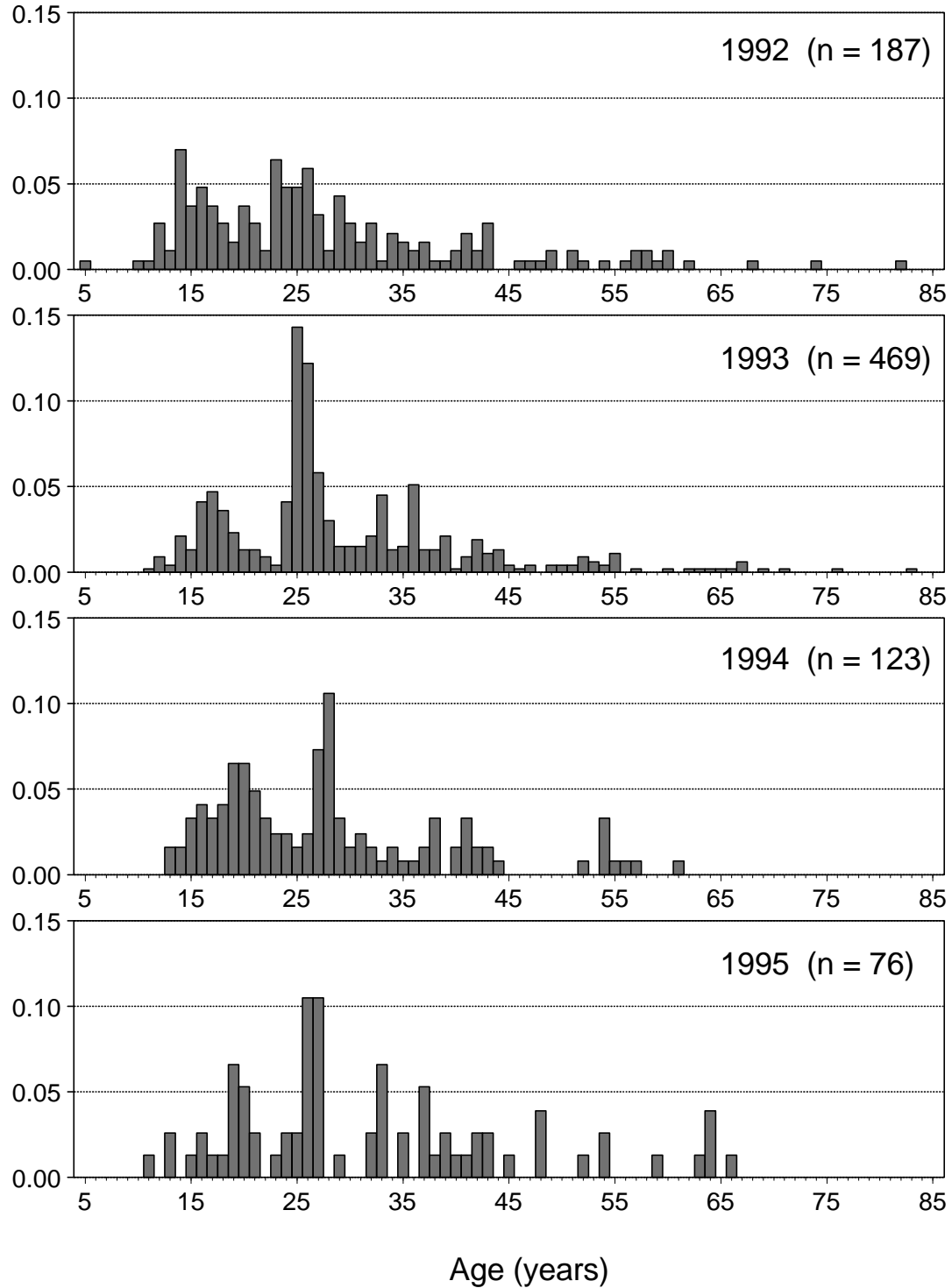


Figure 8.-Estimated age composition of the yelloweye rockfish sport harvest landed at Valdez, Alaska, during the period 1992-1995.

Proportion of Harvest

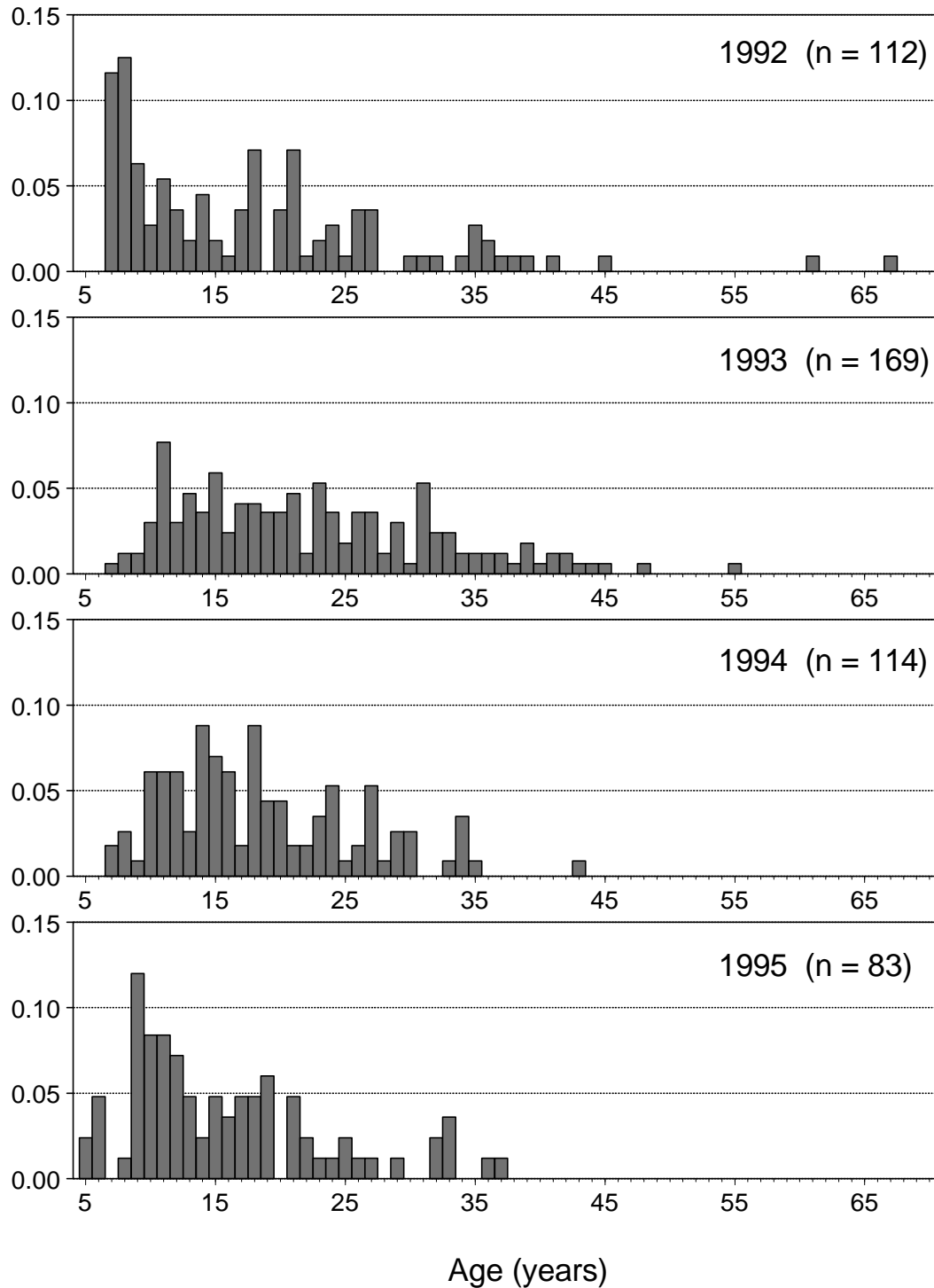


Figure 9.-Estimated age composition of the dusky rockfish sport harvest landed at Kodiak, Alaska, during the period 1992-1995.

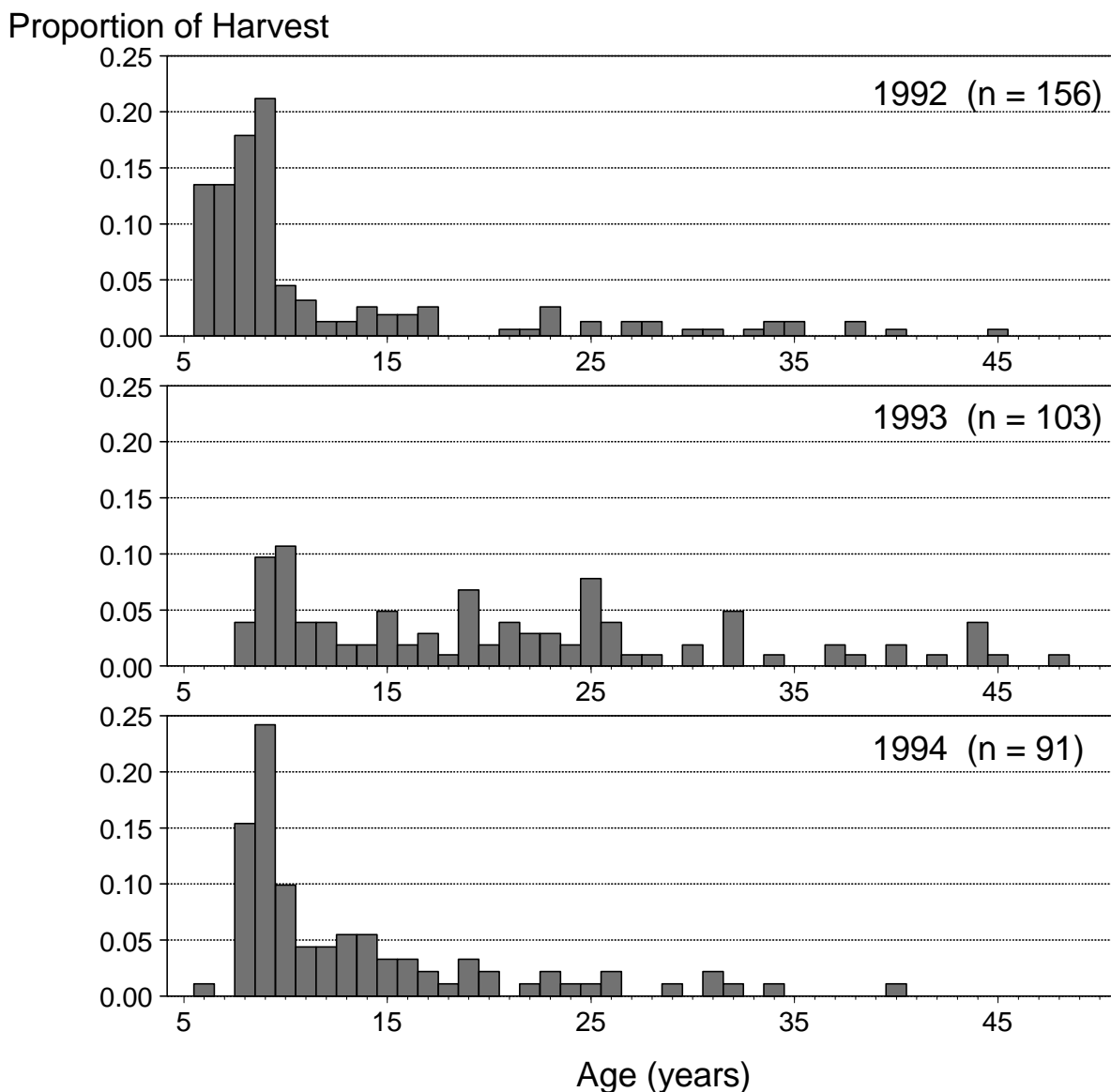


Figure 10.-Estimated age composition of the dusky rockfish sport harvest landed at Homer, Alaska, in 1992, 1993, and 1994.

Yelloweye rockfish ranged in length from 21.3 to 89.5 cm. Most fish landed at Homer and Seward were in the range 45-70 cm, but fish landed at Valdez tended to be slightly smaller, in the range 35-65 cm (Figure 17). Inter-annual variation in lengths appeared greater at Homer and Valdez than at Seward.

The only other species for which sample sizes were sufficient to estimate length composition were dusky and quillback rockfish, and even these were limited to certain ports and years. Dusky rockfish ranged from 20.9 to 57.9 cm in length, but most fish harvested at Kodiak,

Homer, and Seward were in the range 30-50 cm (Figure 18). As was the case with estimates of age composition, the length distributions at Kodiak and Homer were quite variable between years. Sampled quillback rockfish ranged from 30.5 to 56.1 cm in length. Most quillback rockfish landed at Seward and Valdez were in the range 35-45 cm, but the Valdez harvest was more evenly dispersed over a wider range of ages (Figure 19).

Sex Composition

Black rockfish sex composition was estimated with the desired level of precision ($SE < 0.05$) at each port every year except Homer in 1995 (Appendix B6). The proportion of the harvest composed of females ranged from 0.317 to 0.844 among all ports and years (Table 6). Differences among years were not significant at Kodiak ($\chi^2 = 4.88$, $df = 3$, $P = 0.18$); Homer ($\chi^2 = 1.89$, $df = 3$, $P = 0.60$); or Seward ($\chi^2 = 1.62$, $df = 3$, $P = 0.65$). They were significant at Valdez, however ($\chi^2 = 11.01$, $df = 3$, $P = 0.01$). The proportion of females increased in a consistent easterly direction from Kodiak to Valdez, and the directional trend was significant (Cochran-Mantel-Haenszel Test statistic = 281.9, $P = 0.001$).

Proportion of Harvest

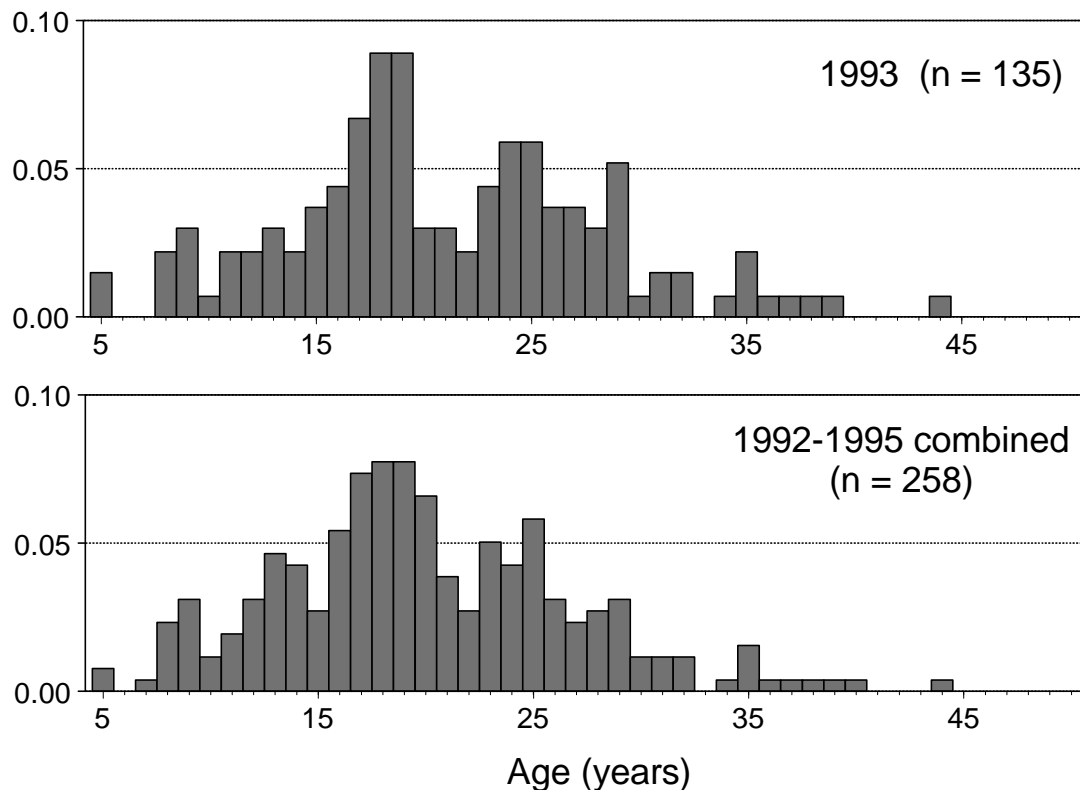


Figure 11.-Estimated age composition of the dusky rockfish sport harvest landed at Seward, Alaska, in 1993 (upper) and during the entire period 1992-1995 (lower).

Proportion of Harvest

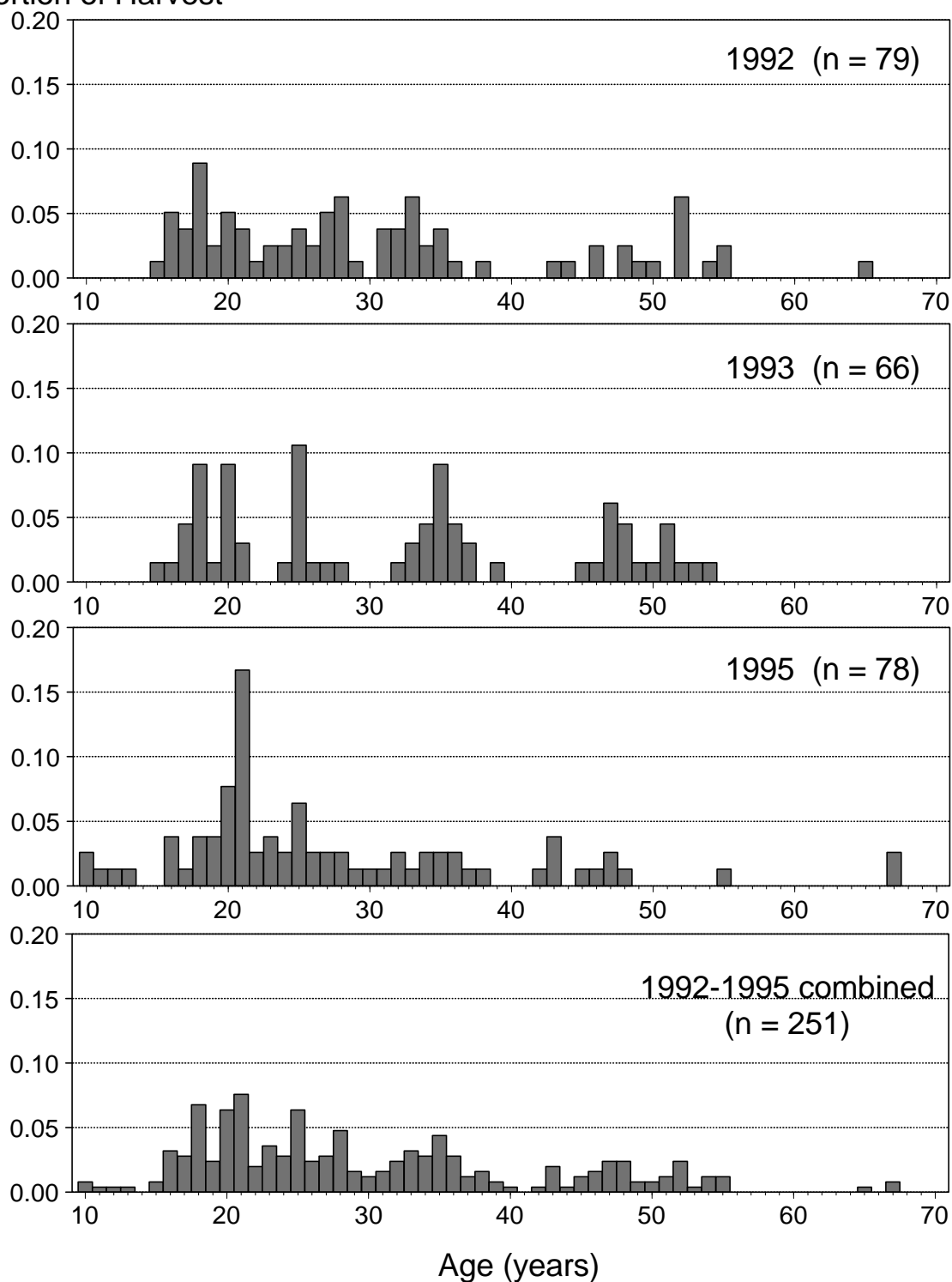


Figure 12.-Estimated age composition of the quillback rockfish sport harvest landed at Seward, Alaska, in 1992, 1993, 1995, and during the entire period 1992-1995.

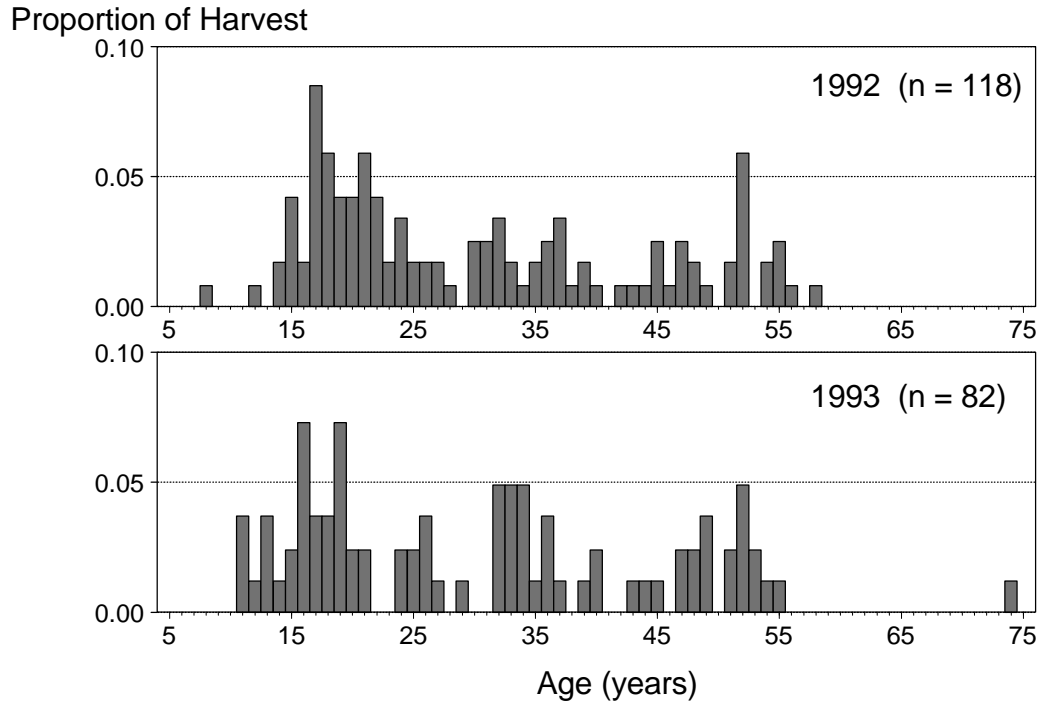


Figure 13.-Estimated age composition of the quillback rockfish sport harvest landed at Valdez, Alaska, in 1992 and 1993.

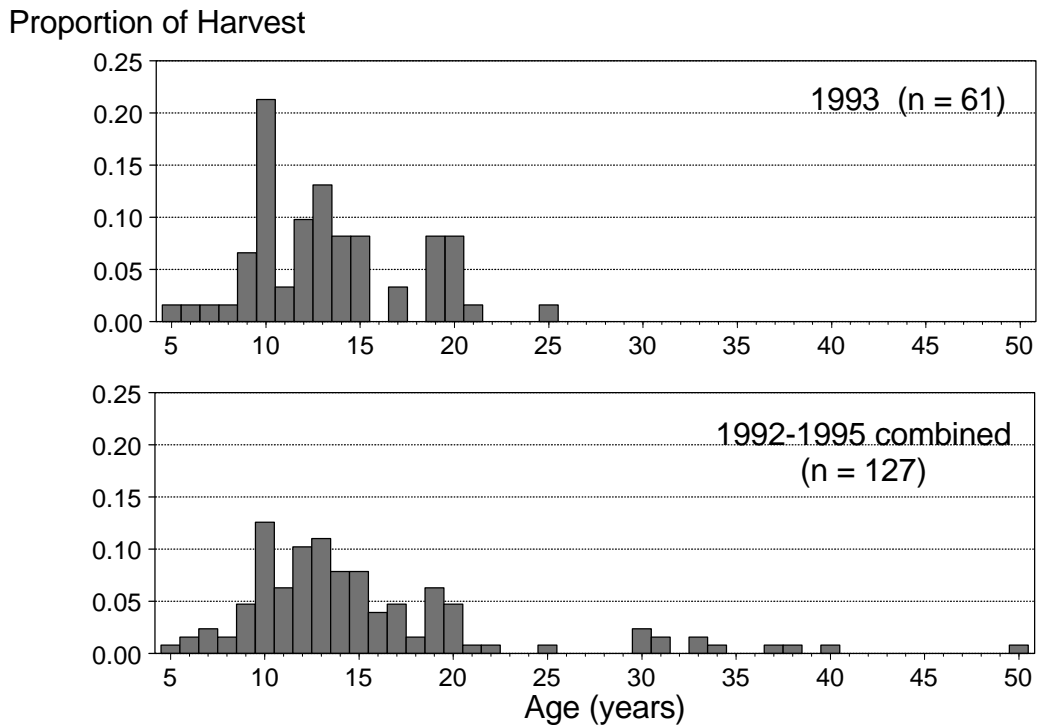
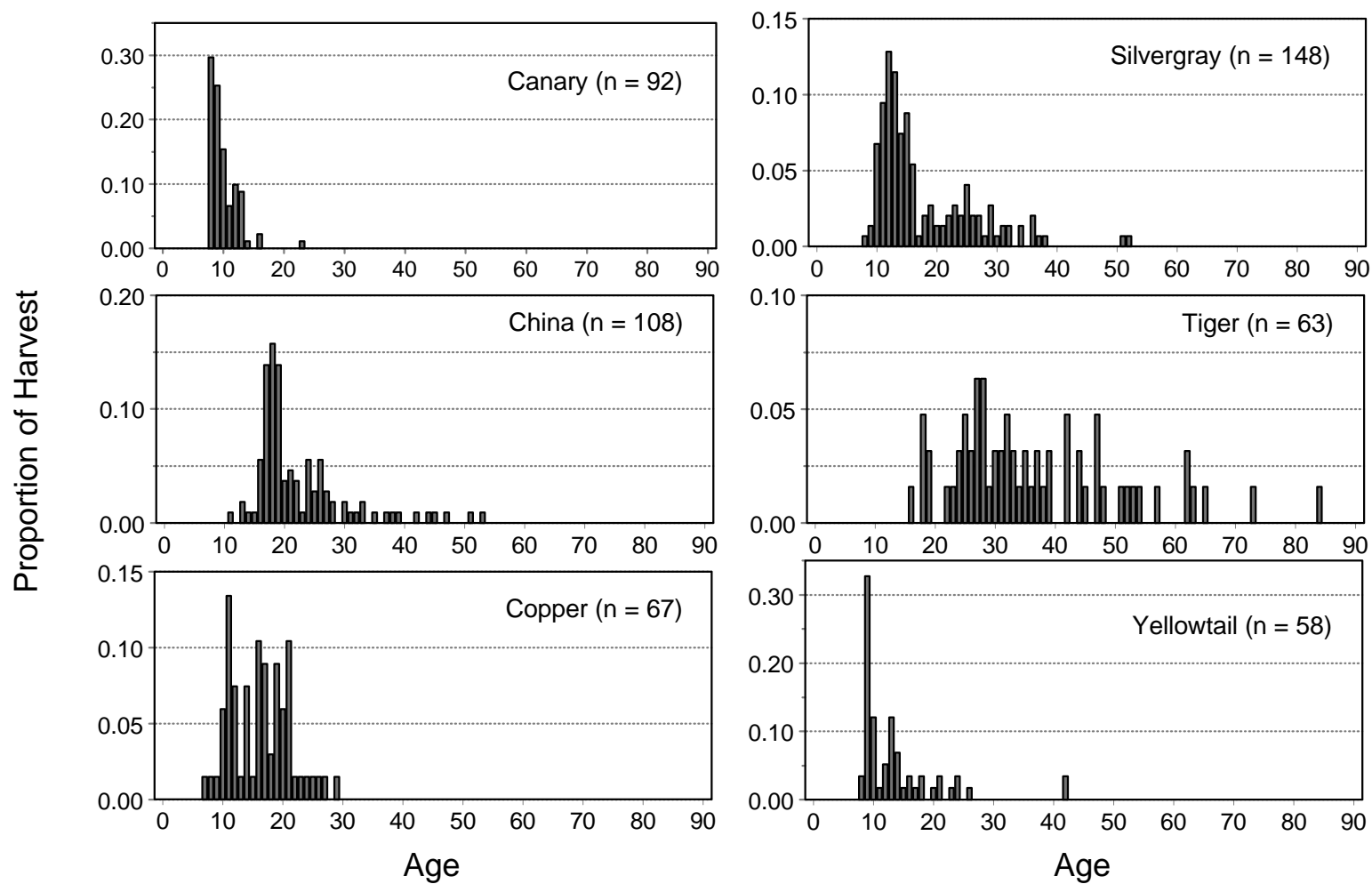


Figure 14.-Estimated age composition of the copper rockfish sport harvest landed at Valdez, Alaska, in 1993 and during the period 1992-1995.



Note: Vertical scales differ from graph to graph.

Figure 15.-Estimated age composition of the sport harvest of canary, China, copper, silvergray, tiger, and yellowtail rockfish landed at Seward, Alaska, 1992-1995.

Cumulative Percent of Harvest

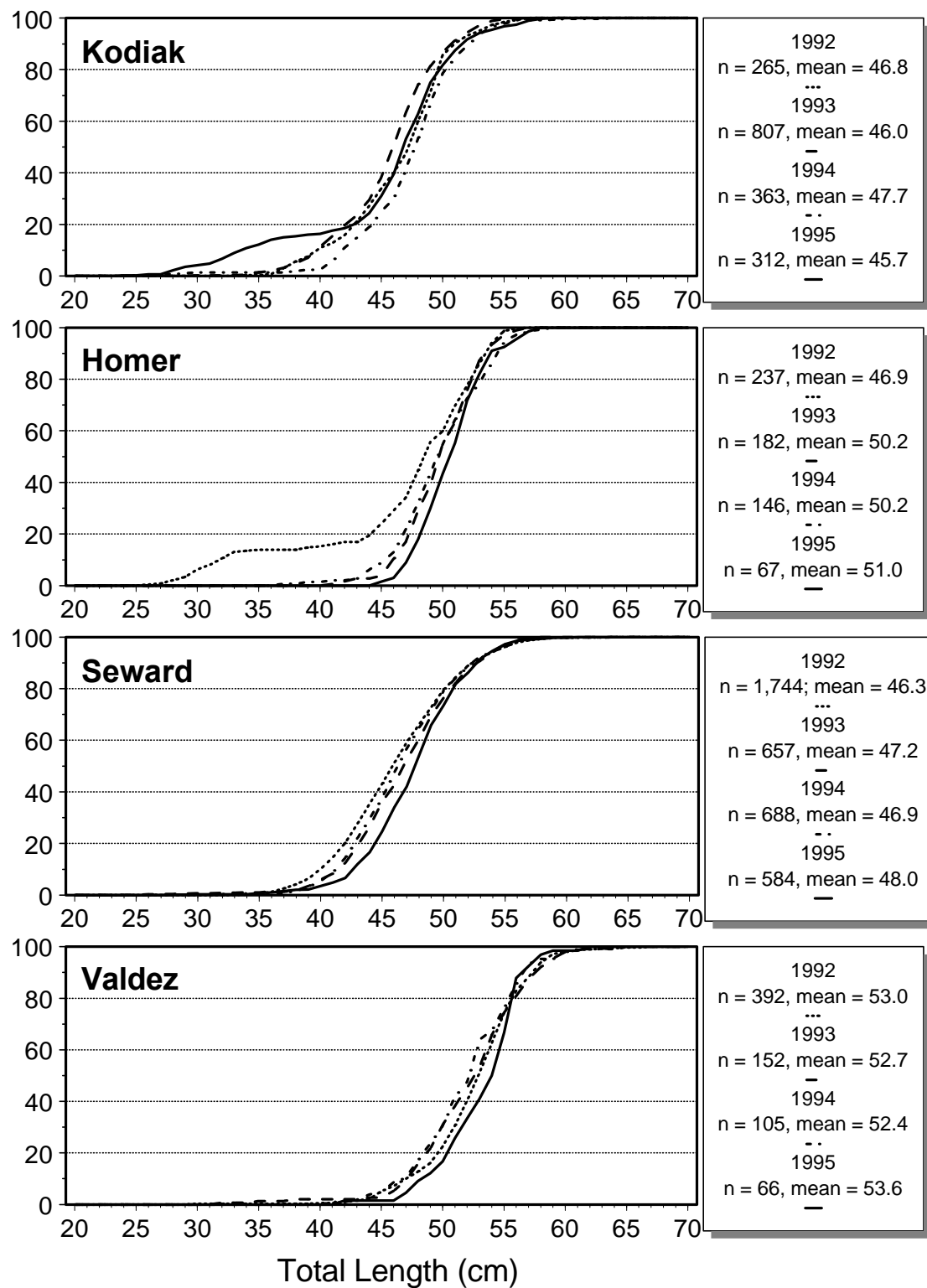


Figure 16.-Estimated length composition of the black rockfish sport harvest landed at Kodiak, Homer, Seward, and Valdez, Alaska, 1992-1995.

Cumulative Percent of Harvest

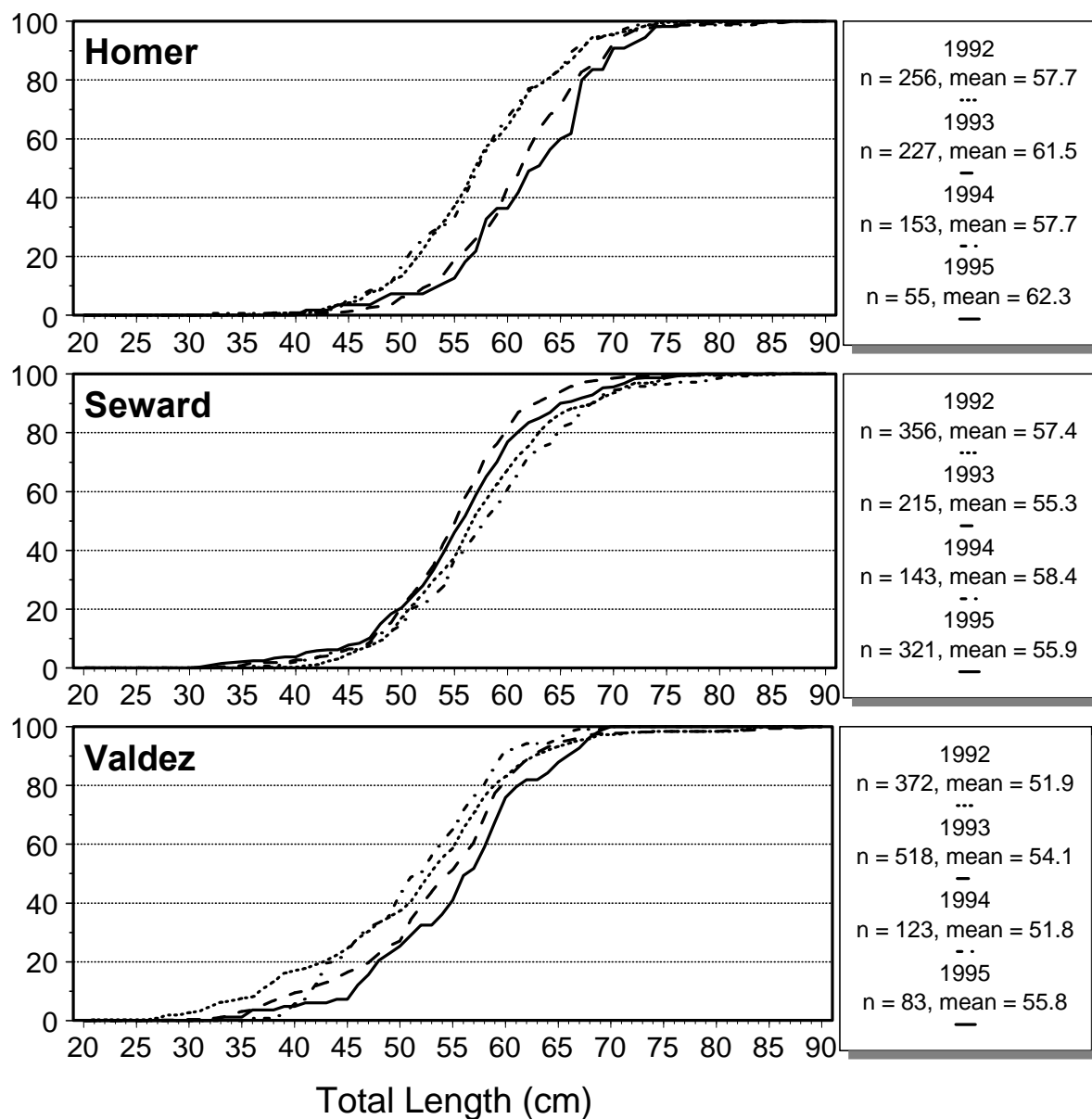


Figure 17.-Estimated length composition of the yelloweye rockfish sport harvest landed at Homer, Seward, and Valdez, Alaska, 1992-1995.

Yelloweye sex composition was estimated for most years at all ports except Kodiak. The proportion of females in the harvest ranged from 0.416 to 0.575 among all ports and years (Table 7, Appendix B7). The sex ratio was less variable than for black rockfish, with no significant differences among years at any port (minimum $P = 0.07$). As with black rockfish, there was a significant trend in sex composition with the proportion of females increasing to the east (Cochran-Mantel-Haenszel Test statistic = 10.2, $P = 0.001$).

Data were sufficient to estimate dusky and quillback rockfish sex composition for selected ports and years. The proportion of females in the dusky rockfish harvest ranged from 0.516 to 0.734 among the ports and years (Appendix B8). Differences between years were significant at Kodiak ($\chi^2 = 9.50$, $df = 3$, $P = 0.02$) but not at Homer ($\chi^2 = 5.47$, $df = 2$, $P = 0.06$). The proportion of female quillback rockfish in the Seward and Valdez harvests ranged from 0.403 to 0.535 (Appendix B9). Differences between years were not significant at either port (max $P = 0.47$).

Cumulative Percent of Harvest

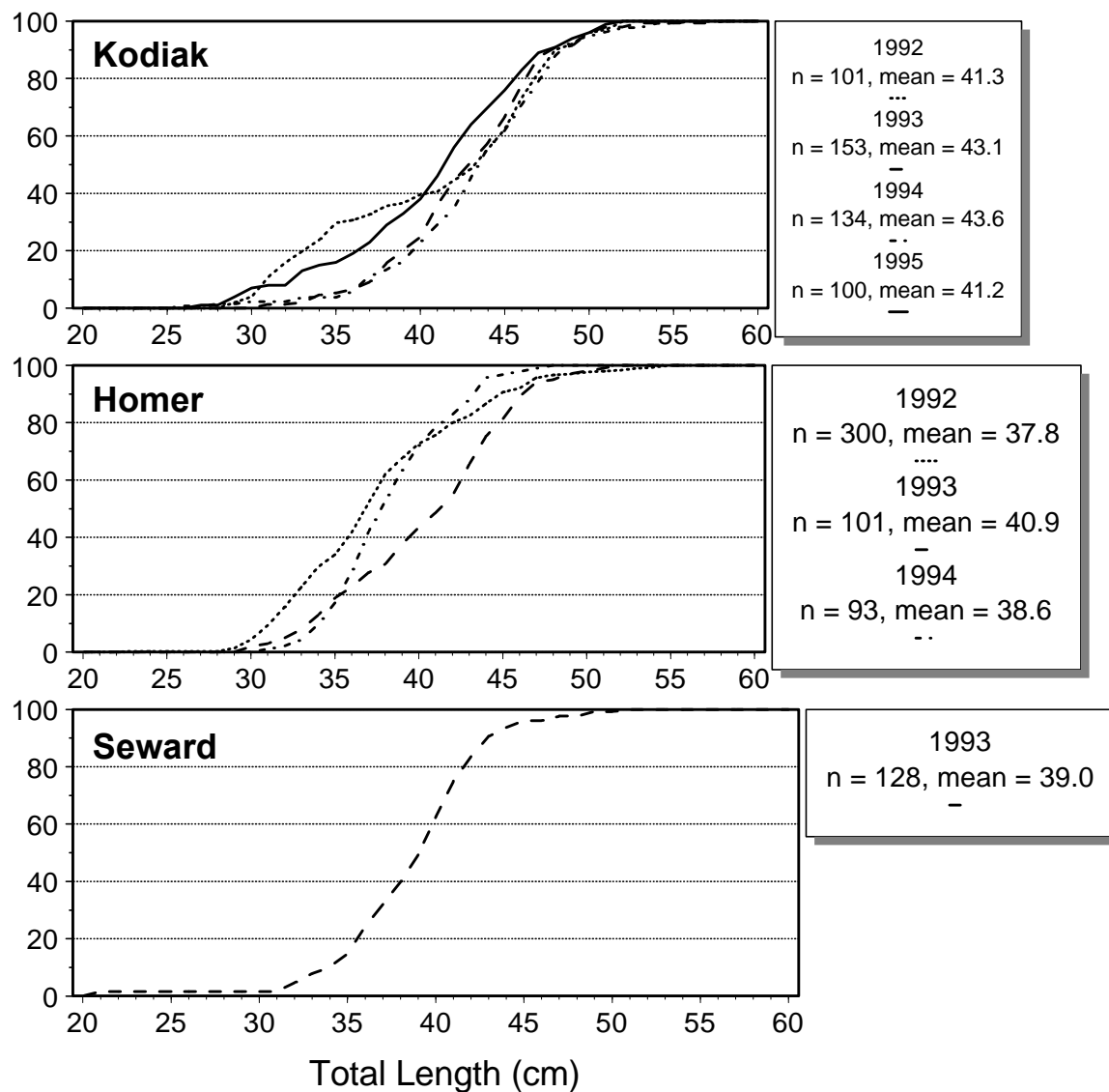


Figure 18.-Estimated length composition of the dusky rockfish sport harvest landed at Kodiak, Homer, and Seward, Alaska, 1992-1995.

Cumulative Percent of Harvest

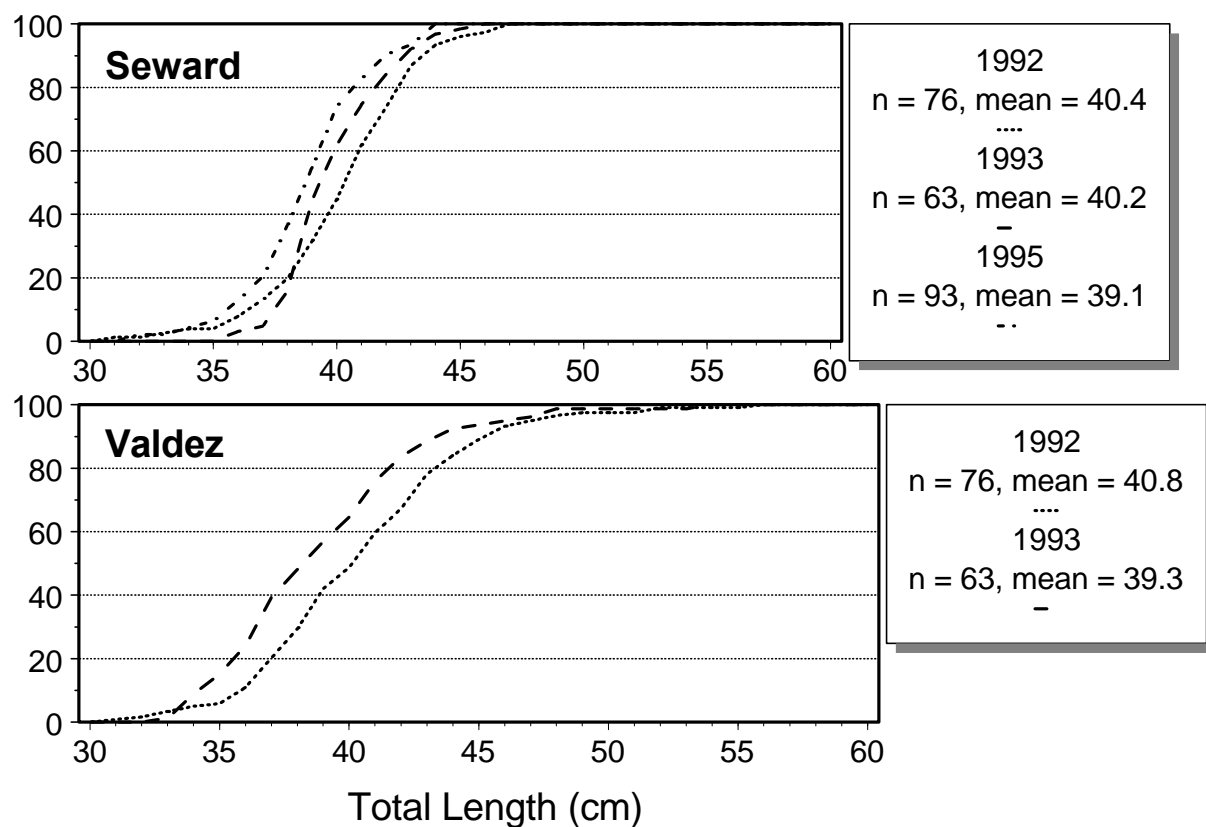


Figure 19.-Estimated length composition of the quillback rockfish sport harvest landed at Seward, and Valdez, Alaska, 1992-1995.

Table 6.-Proportions of the recreational black rockfish harvest from Southcentral Alaska that were female, 1992-1995.

Year	Port			
	Kodiak	Homer	Seward	Valdez
1992	0.317	0.467	0.585	0.781
1993	0.373	0.522	0.558	0.664
1994	0.401	0.457	0.582	0.703
1995	0.392	0.508	0.587	0.844

Table 7.-Proportions of the recreational yelloweye rockfish harvest from Southcentral Alaska that were female, 1992-1995.

Year	Port		
	Homer	Seward	Valdez
1992	0.416	0.475	0.572
1993	0.439	0.453	0.488
1994	0.507	0.531	0.464
1995	0.423	0.487	0.575

GEOGRAPHIC DISTRIBUTION OF EFFORT AND HARVEST

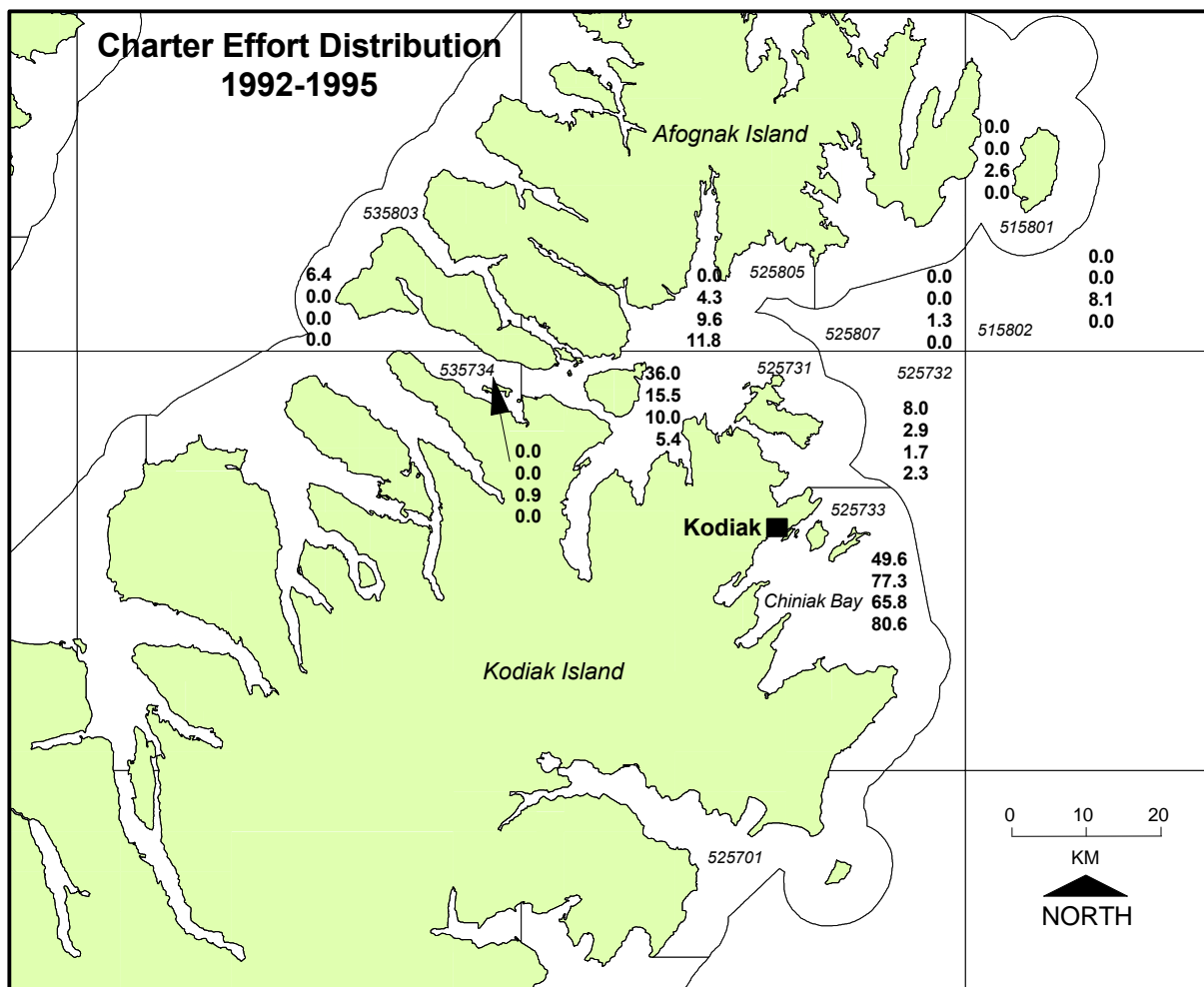
Kodiak

Interviewed anglers expended from 546 to 1,562 angler-days of effort annually (Appendix B10). Chiniak Bay (statistical area 525733) accounted for the majority of effort by charter and private boats based in the city of Kodiak (Figures 20-21). In some years, statistical areas to the north and west also accounted for a significant portion of the effort. In 1992, for example, statistical area 525731 accounted for over a third of the charter effort. Because the area near the boundary of these two statistical areas ("Buoy 4") was a popular fishing ground, minor changes in the distribution of vessels in this area probably contributed to the inter-annual variation in effort in those two statistical areas. Some effort for bottomfish was known to occur outside of the areas indicated in Figures 20 and 21 by charter boats whose skippers declined to be interviewed.

Interviewed anglers also reported harvesting from 205 to 433 rockfish annually (Appendix B10). Rockfish harvest was roughly distributed similarly to bottomfish effort. Chiniak Bay (statistical area 525733) accounted for 82%-84% of the charter harvest in 1993 through 1995 (Figure 22), and 58%-85% of the private harvest during 1992-1995 (Figure 23). Harvest was occasionally significant in statistical areas to the north and west.

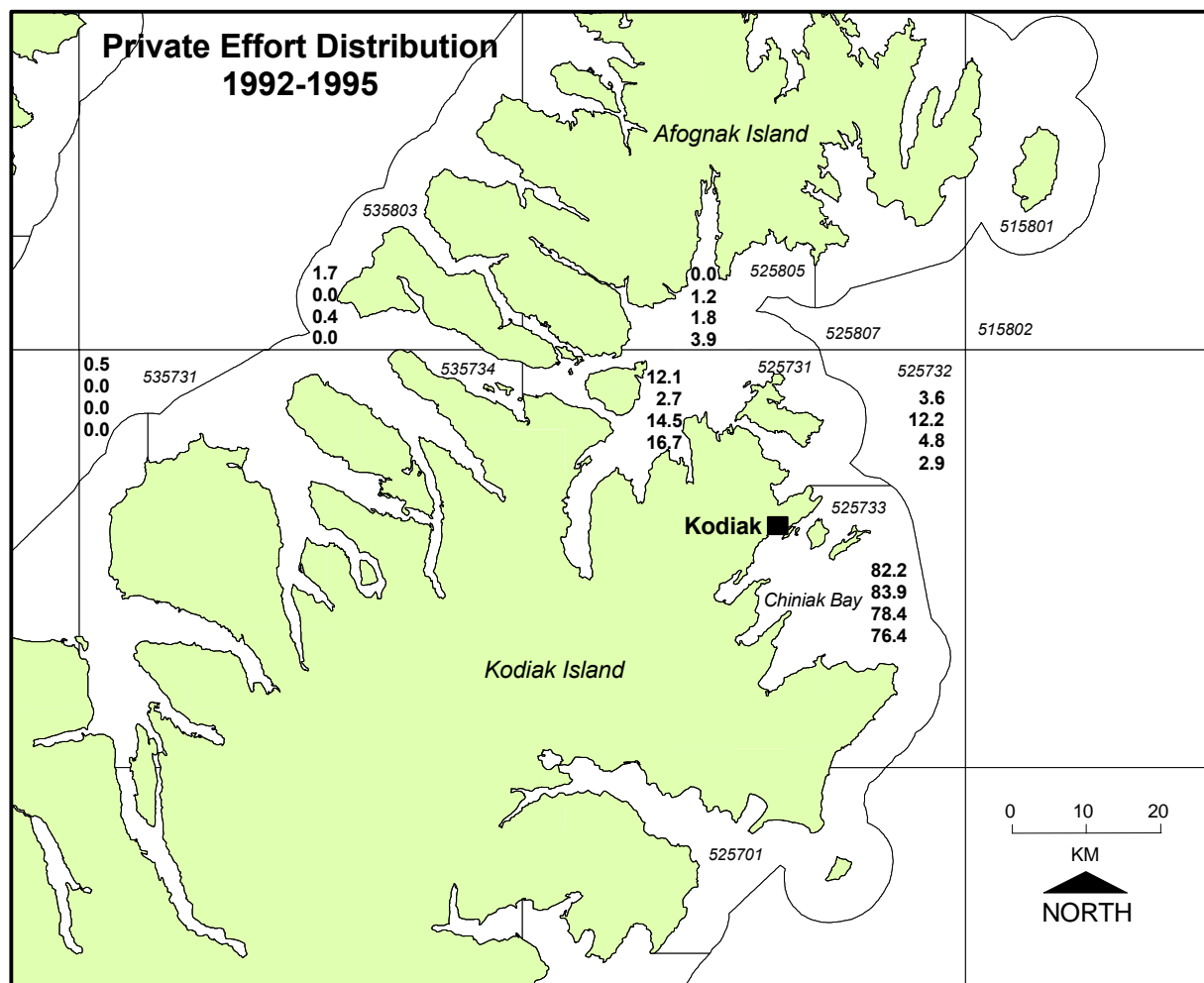
Homer

Interviewed anglers expended 5,803 angler-days of effort in 1992, and from 1,751 to 2,992 angler days per year during the period 1993-1995 (Appendix B11). Overall, charter boats tended to fish farther from the port of Homer than private boats (Figures 24-26). Although it is difficult to compare the estimates from 1992 with those from subsequent years, that general rule held true. Roughly half of the charter effort was spent fishing the two large statistical areas in the central part of Cook Inlet (525902 and 525931). Charter effort was also concentrated in statistical area 515905 southwest of the Chugach Islands. Private effort was consistently heaviest in Kachemak Bay, but the central portion of Cook Inlet did account for 18%-36% of the effort from 1992 to 1995.

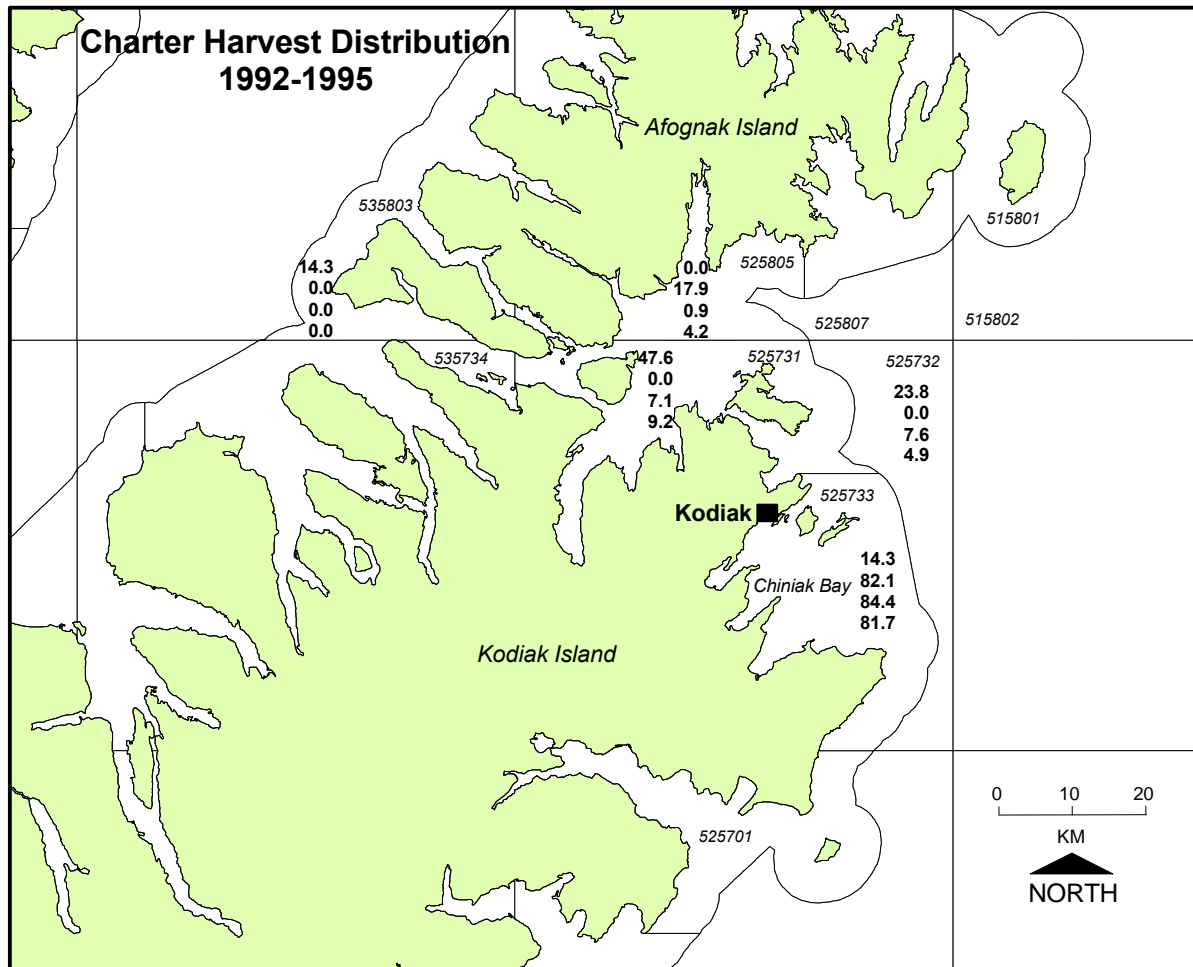


Note: The bold numbers in each ADF&G statistical area represent the percentage of total angler-days reported fishing in 1992 (top) through 1995 (bottom). Statistical areas without numbers had no effort reported by interviewed anglers.

Figure 20.-Spatial distribution of recreational effort for bottomfish by charter anglers interviewed in Kodiak, 1992-1995.

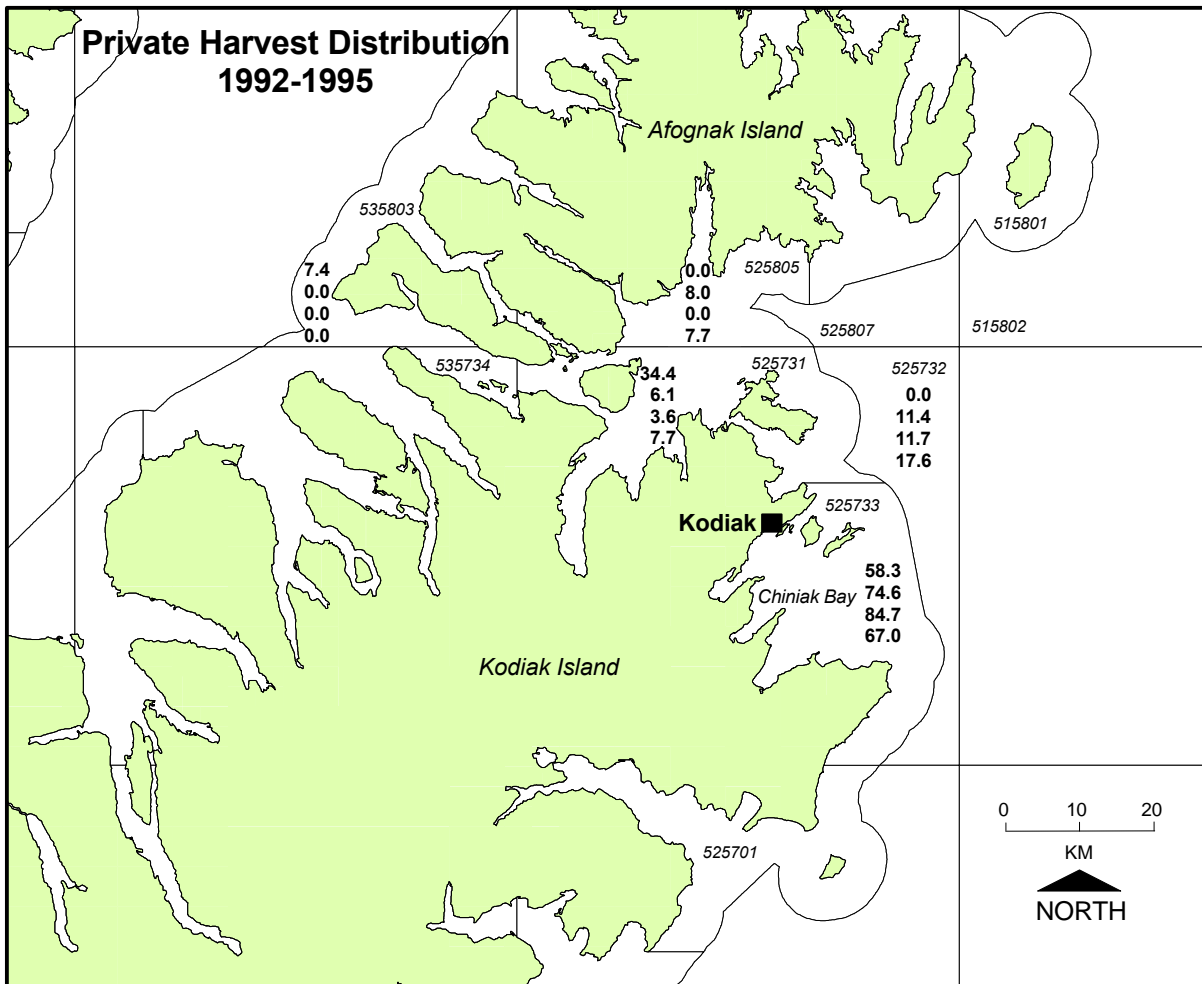


Note: The bold numbers in each ADF&G statistical area represent the percentage of total angler-days reported fishing in 1992 (top) through 1995 (bottom). Statistical areas without numbers had no effort reported by interviewed anglers.



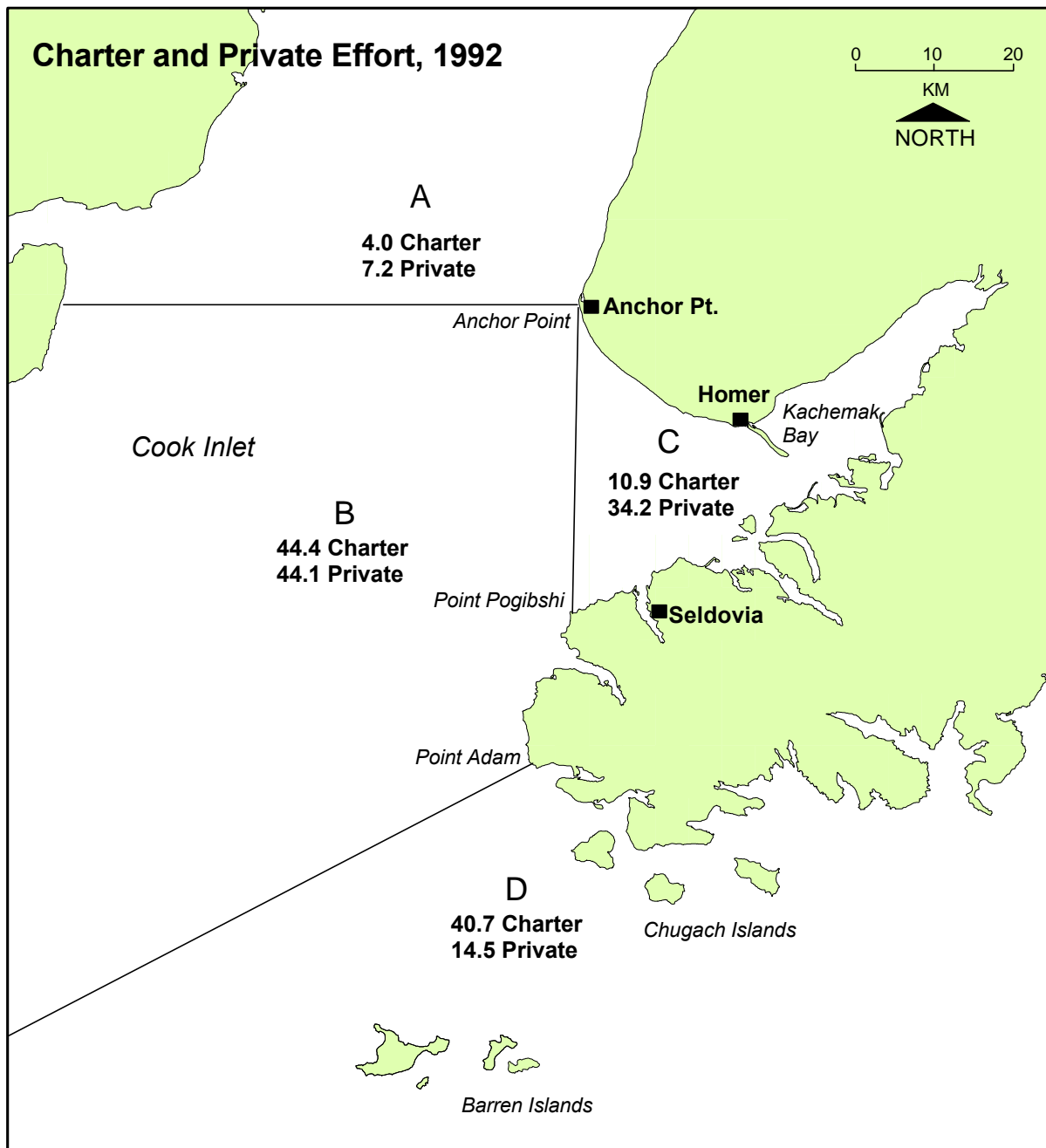
Note: The bold numbers in each ADF&G statistical area represent the percentage of the number of fish reported harvested in 1992 (top) through 1995 (bottom). Statistical areas without numbers had no reported harvest by interviewed anglers.

Figure 22.-Spatial distribution of recreational rockfish harvest (all species) by charter anglers interviewed in Kodiak, 1992-1995.



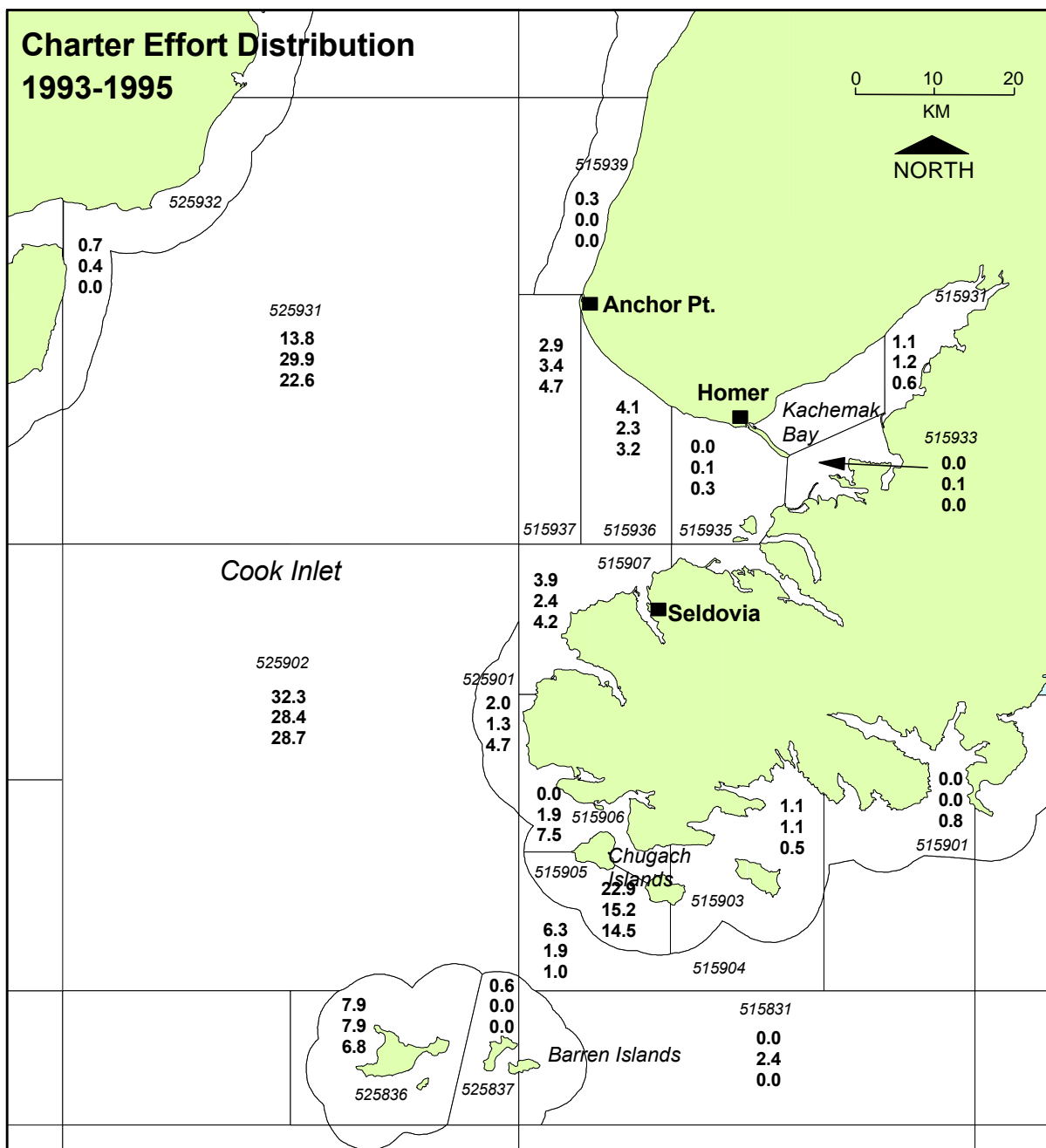
Note: The bold numbers in each ADF&G statistical area represent the percentage of the number of fish reported harvested in 1992 (top) through 1995 (bottom). Statistical areas without numbers had no reported harvest by interviewed anglers.

Figure 23.-Spatial distribution of recreational rockfish harvest (all species) by private anglers interviewed in Kodiak, 1992-1995.



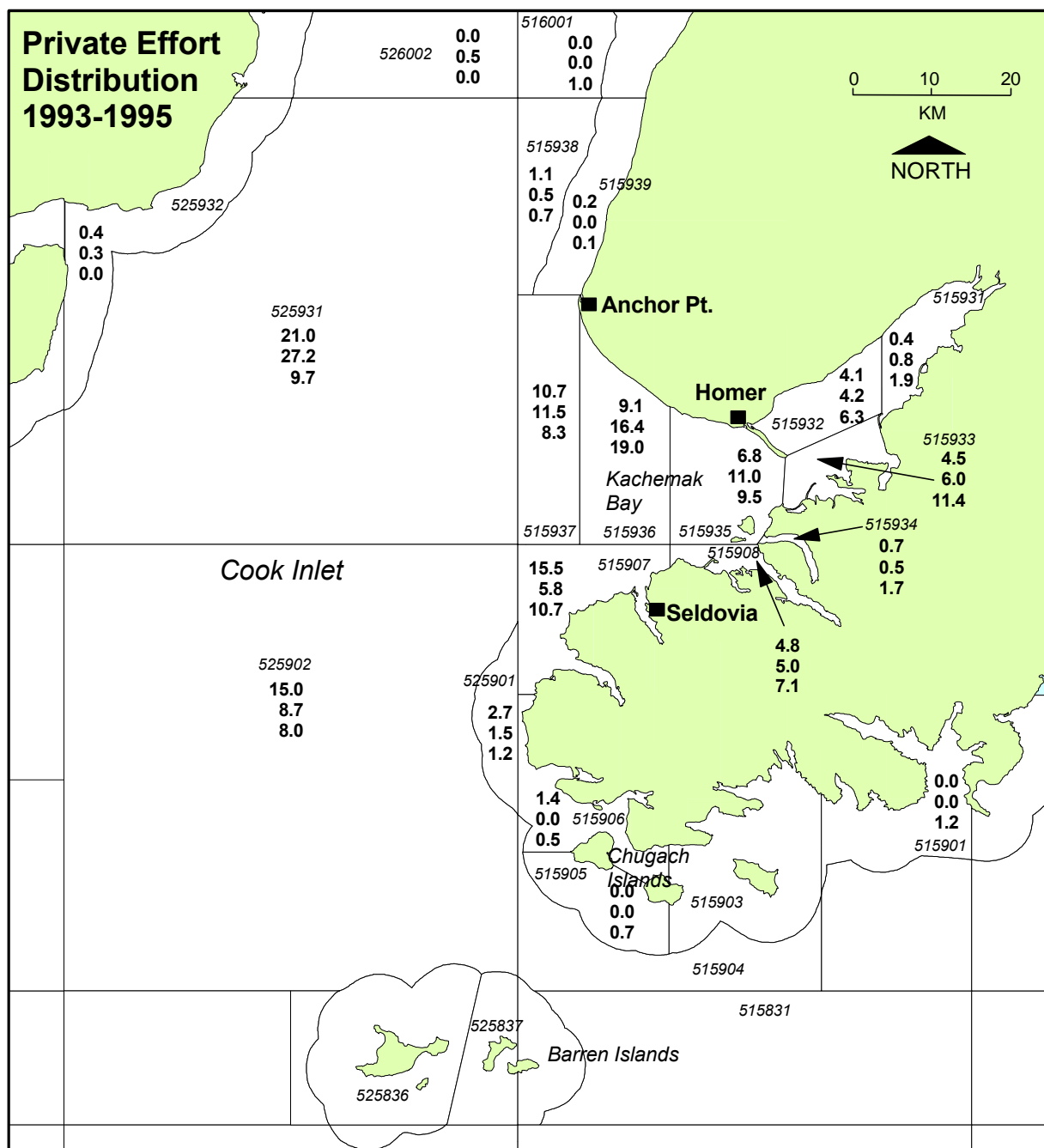
Note: The numbers in each area represent the percentage of the total angler-days for each user group that were reported in that area.

Figure 24.-Spatial distribution of recreational effort for bottomfish by charter and private anglers interviewed at Homer in 1992.



Note: The bold numbers in each ADF&G statistical area represent the percentage of total angler-days reported fishing in 1993 (top) through 1995 (bottom). Statistical areas without numbers had no effort reported by interviewed anglers.

Figure 25.-Spatial distribution of recreational effort for bottomfish by charter anglers interviewed at Homer, 1993-1995.



Note: The bold numbers in each ADF&G statistical area represent the percentage of total angler-days reported fishing in 1993 (top) through 1995 (bottom). Statistical areas without numbers had no effort reported by interviewed anglers.

Figure 26.-Spatial distribution of recreational effort for bottomfish by private anglers interviewed at Homer, 1993-1995.

Rockfish harvest per day of bottomfish effort was relatively low in Homer. Charter anglers that were interviewed reported a very modest rockfish harvest of 57 to 147 fish annually from 1993 to 1995 (Appendix B11). The vast majority of rockfish harvest was from nearshore waters off the southwest tip of the Kenai Peninsula, primarily stat areas 515903, 515905, 515906, and 515907 (Figure 27). Interviewed private anglers reported harvests of only 11 rockfish in 1993 and one fish in 1994.

Seward

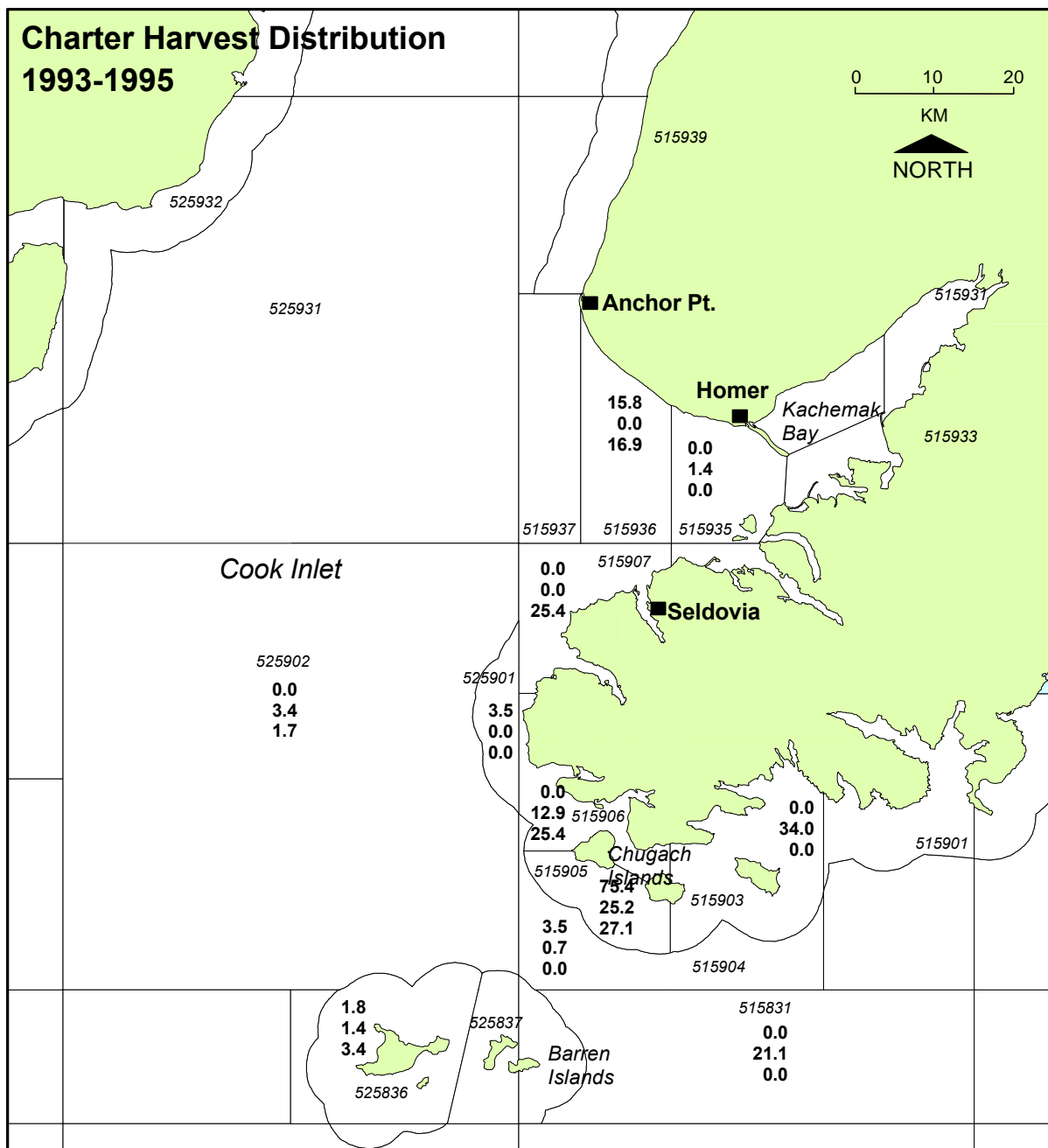
Bottomfishing effort reported in Seward military camp voluntary logbooks ranged from 6,872 to 8,147 angler-days (Appendix B12). These anglers also reported annual harvests of 8,251 to 12,080 rockfish. Effort and rockfish harvest by military camp anglers ranged over a large area, but was concentrated in the southern portion of Resurrection Bay (495938), the Aialik Cape–Chiswell Islands area (495932), and waters from Johnstone Bay to Cape Puget (485935) (Figures 28 and 29). Most of the effort and harvest in statistical areas 495938 and 495932 was by smaller (27-foot) boats run by the Army camp because these vessels were restricted to these waters under camp rules. Effort beyond this area was largely by larger Army and Air Force vessels. Rockfish harvest was generally distributed similarly to effort, probably because military boats frequently targeted rockfish. Stat area 495932 accounted for 52%-58% of the effort but 62%-77% of the harvest, reflecting not only the abundance of rockfish and good rockfish habitat in this area, but also the tendency for smaller Army boats to target rockfish. The larger boats typically targeted halibut and were able to range farther in search of productive halibut grounds.

Effort by non-military anglers that were interviewed ranged from 1,405 to 1,896 angler-days annually (Appendix B13). Charter fishing effort was spread widely from Outer Island to the south side of Montague Island, a distance of about 185 km (Figure 30). Areas most heavily fished by charter boats included the southern portions of Resurrection Bay (495938), and waters from Cape Fairfield to Cape Cleare at the west end of Montague Island. During the period 1992-1995 there appeared to be an eastward displacement of effort from the Johnstone Bay–Puget Bay area (485935) to waters around the west end of Elrington Island and Montague Strait (485931, 485932, and 485933). Effort by private anglers was distributed similarly to that of the military boats, with primary areas being Resurrection Bay (495938), the Chiswell Islands (495932) and the area from Cape Fairfield to Cape Puget (485935) (Figure 31).

Information on rockfish harvest was not collected in 1992, but interviewed anglers harvested from 982 to 1,467 fish during the period 1993-1995 (Appendix B13). As with effort, charter rockfish harvest was also spread over a large area (Figure 32). Harvest was occasionally concentrated in particular stat areas. For example, stat area 485933 accounted for 43% of the charter harvest in 1993, compared with only 2.5% in the following years. Similarly, as charter effort moved eastward into Montague Strait, charter harvest of rockfish rose dramatically. Rockfish private harvest was distributed similarly to effort, with three-quarters of it coming from lower Resurrection Bay (495938) and the Aialik Cape–Chiswell Islands area (495932) (Figure 33).

Valdez

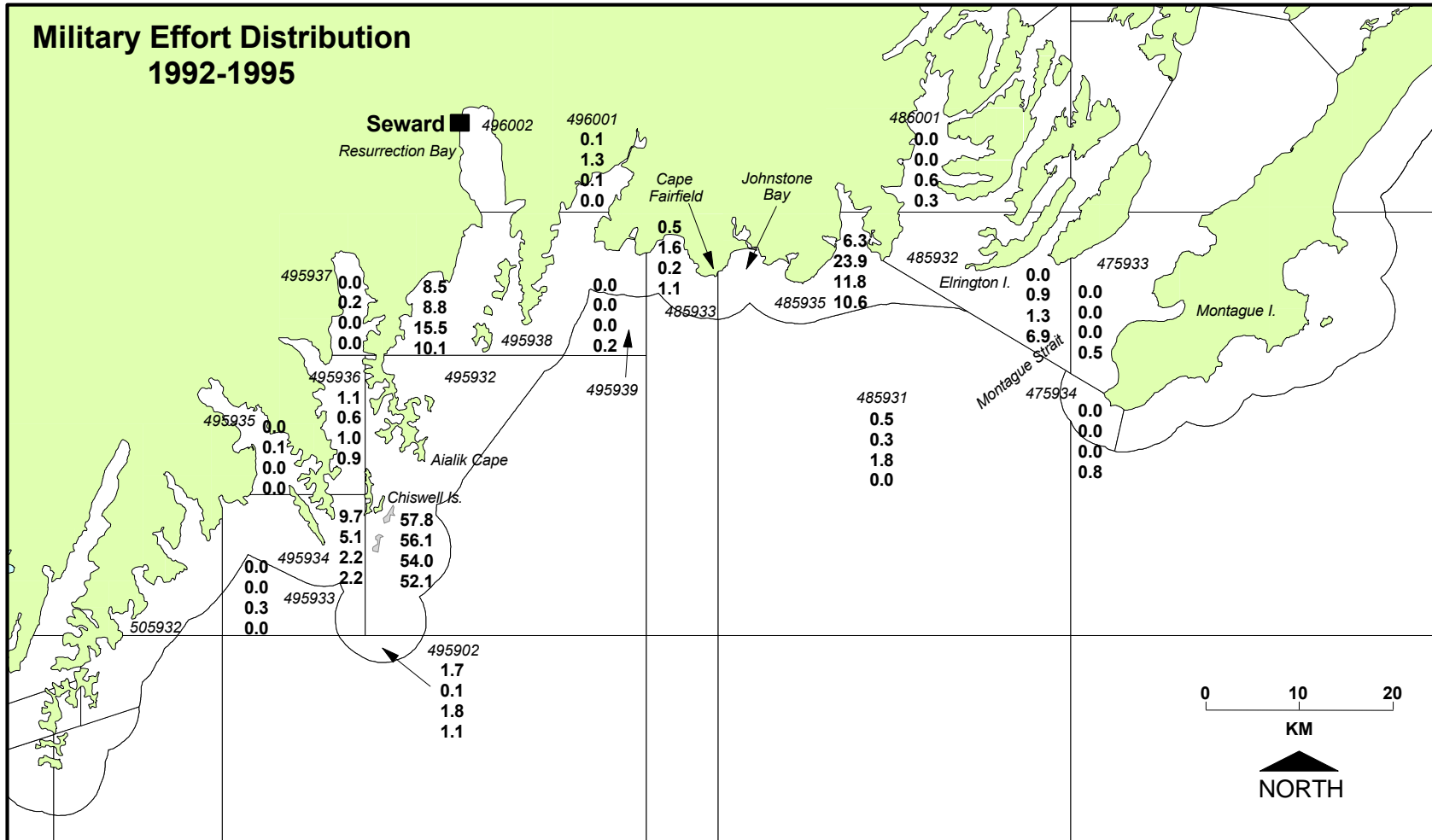
Effort by anglers interviewed at Valdez ranged from 682 to 1,973 days annually during the period 1992-1995 (Appendix B14). As with Seward, charter effort was widely dispersed over the eastern two-thirds of Prince William Sound and waters outside of Hinchinbrook and Montague islands (Figure 34). The majority of charter effort was concentrated around outer



Note: The bold numbers in each ADF&G statistical area represent the percentage of the number of fish reported harvested in 1993 (top) through 1995 (bottom). Statistical areas without numbers had no reported harvest by interviewed anglers.

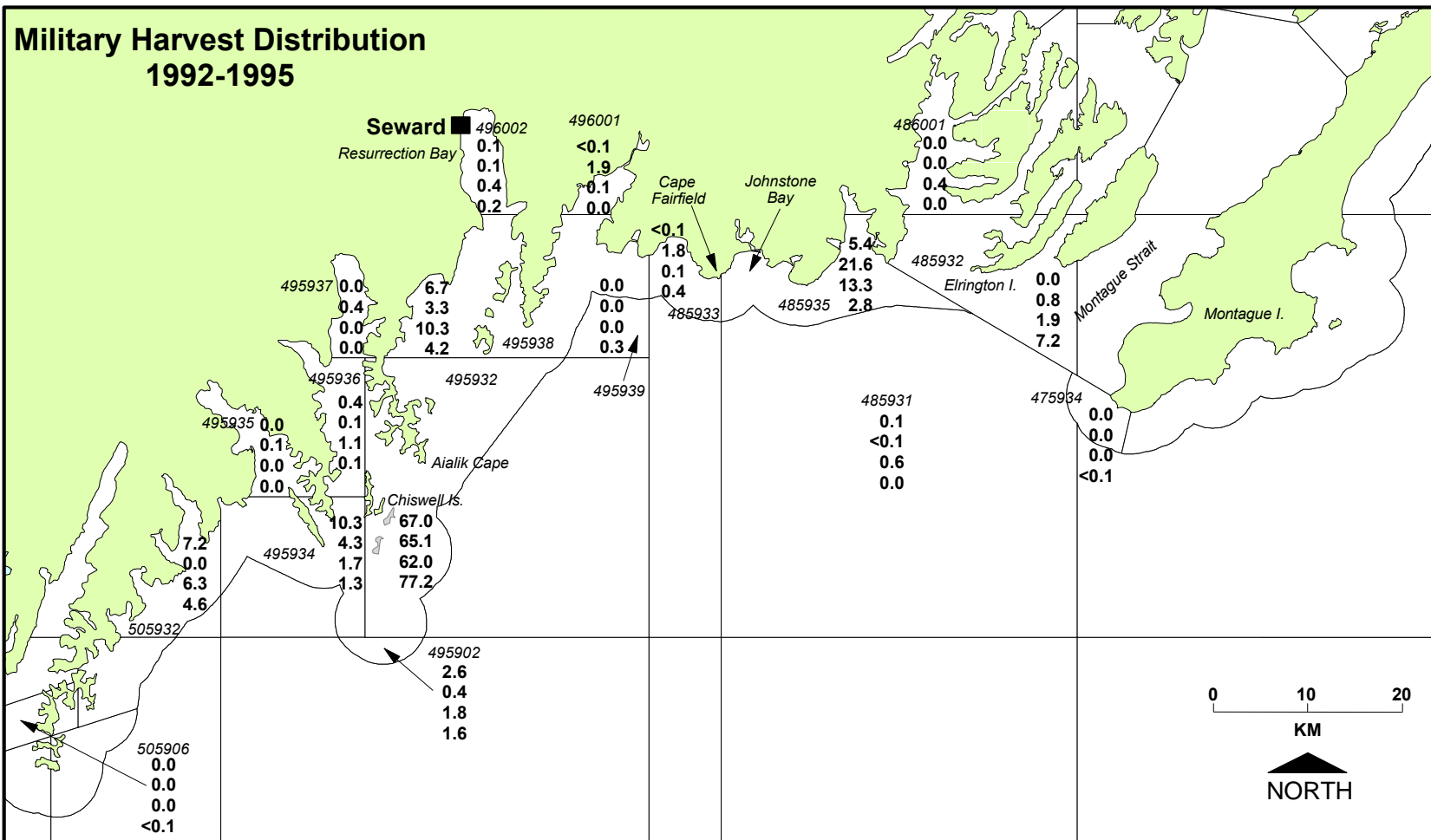
Figure 27.-Spatial distribution of recreational rockfish harvest (all species) by charter anglers interviewed at Homer, 1993-1995.

Military Effort Distribution 1992-1995



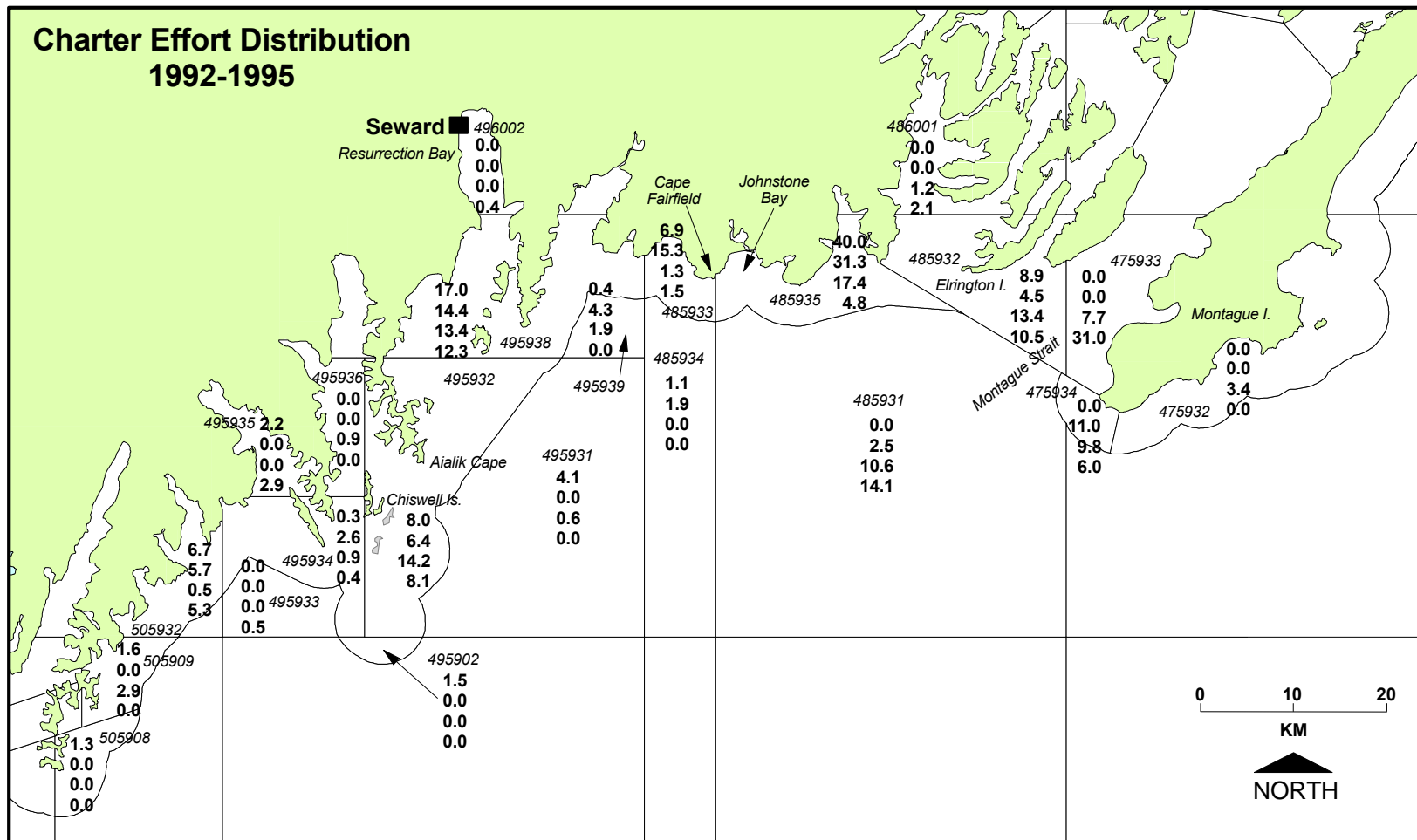
Note: The bold numbers in each ADF&G statistical area represent the percentage of total angler-days reported fishing in 1992 (top) through 1995 (bottom). Statistical areas without numbers had no reported effort.

Figure 28.-Spatial distribution of recreational effort for bottomfish by Seward Military Resort anglers reported in vessel logbooks, 1992-1995.



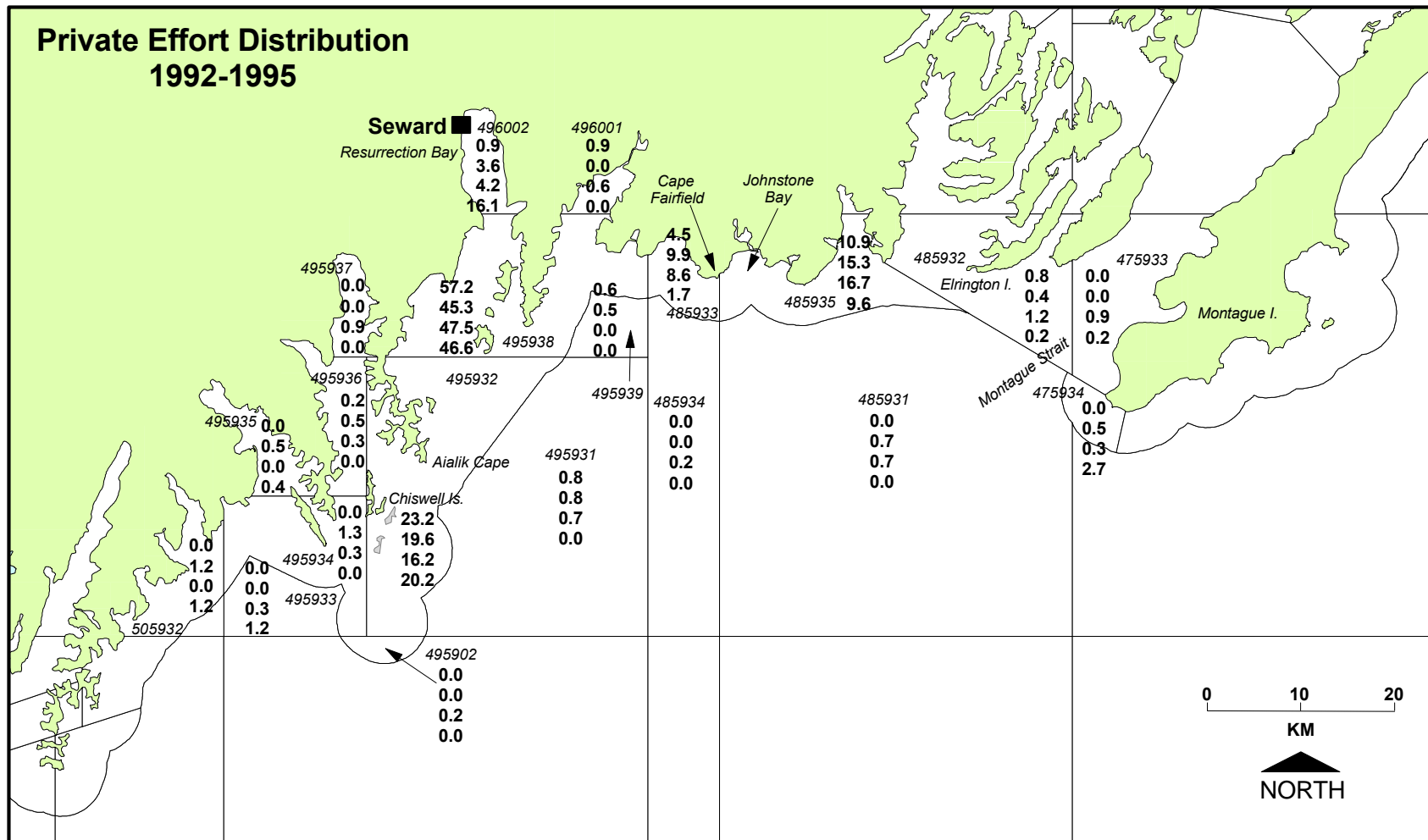
Note: The bold numbers in each ADF&G statistical area represent the percentage of the number of fish reported harvested in 1993 (top) through 1995 (bottom). Statistical areas without numbers had no reported harvest.

Figure 29.-Spatial distribution of the recreational rockfish harvest (all species) by Seward Military Resort anglers reported in vessel logbooks, 1992-1995.



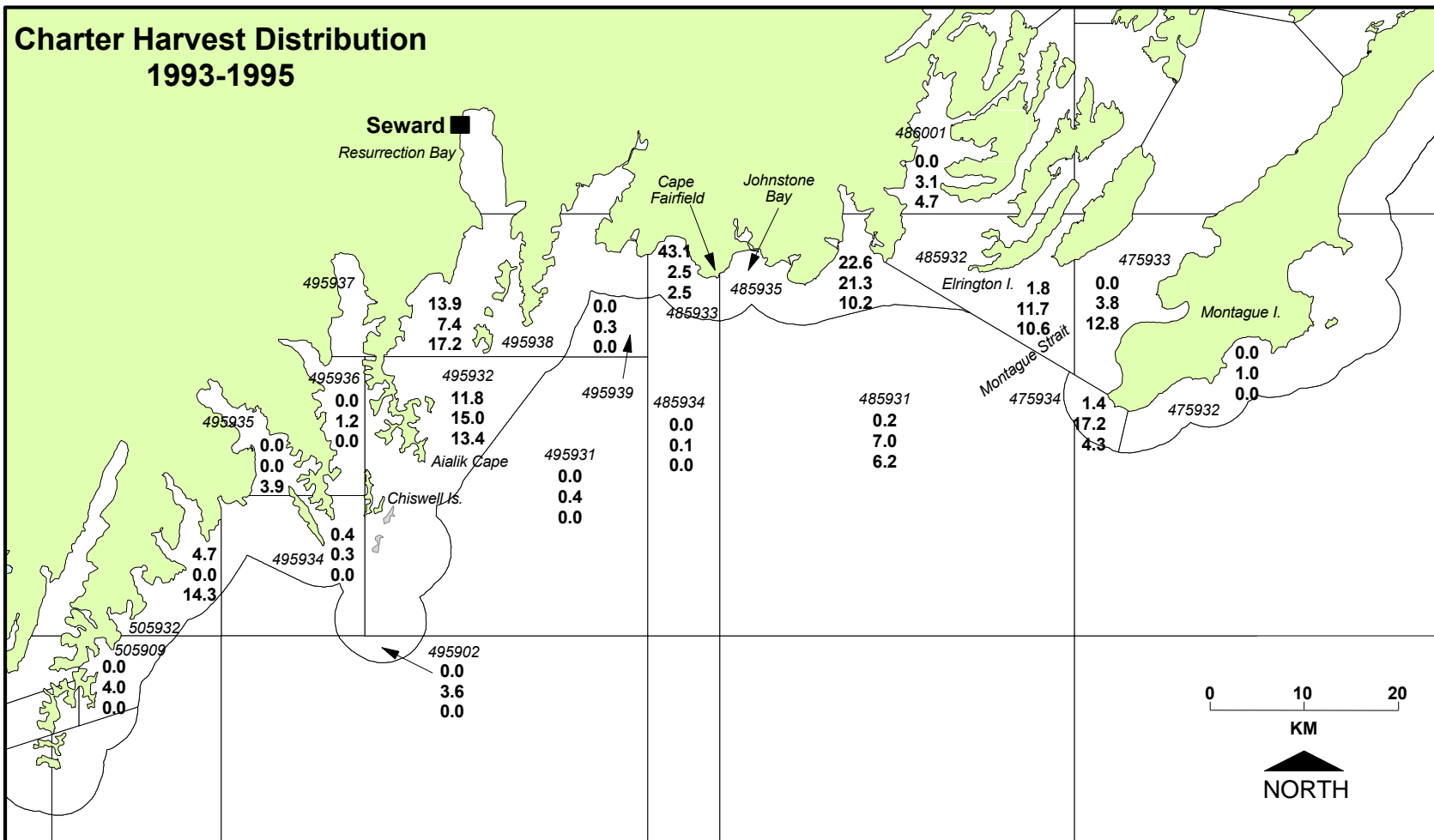
Note: The bold numbers in each ADF&G statistical area represent the percentage of total angler-days reported fishing in 1992 (top) through 1995 (bottom). Statistical areas without numbers had no effort reported by interviewed anglers.

Figure 30.-Spatial distribution of recreational effort for bottomfish by charter anglers interviewed at Seward, 1992-1995.



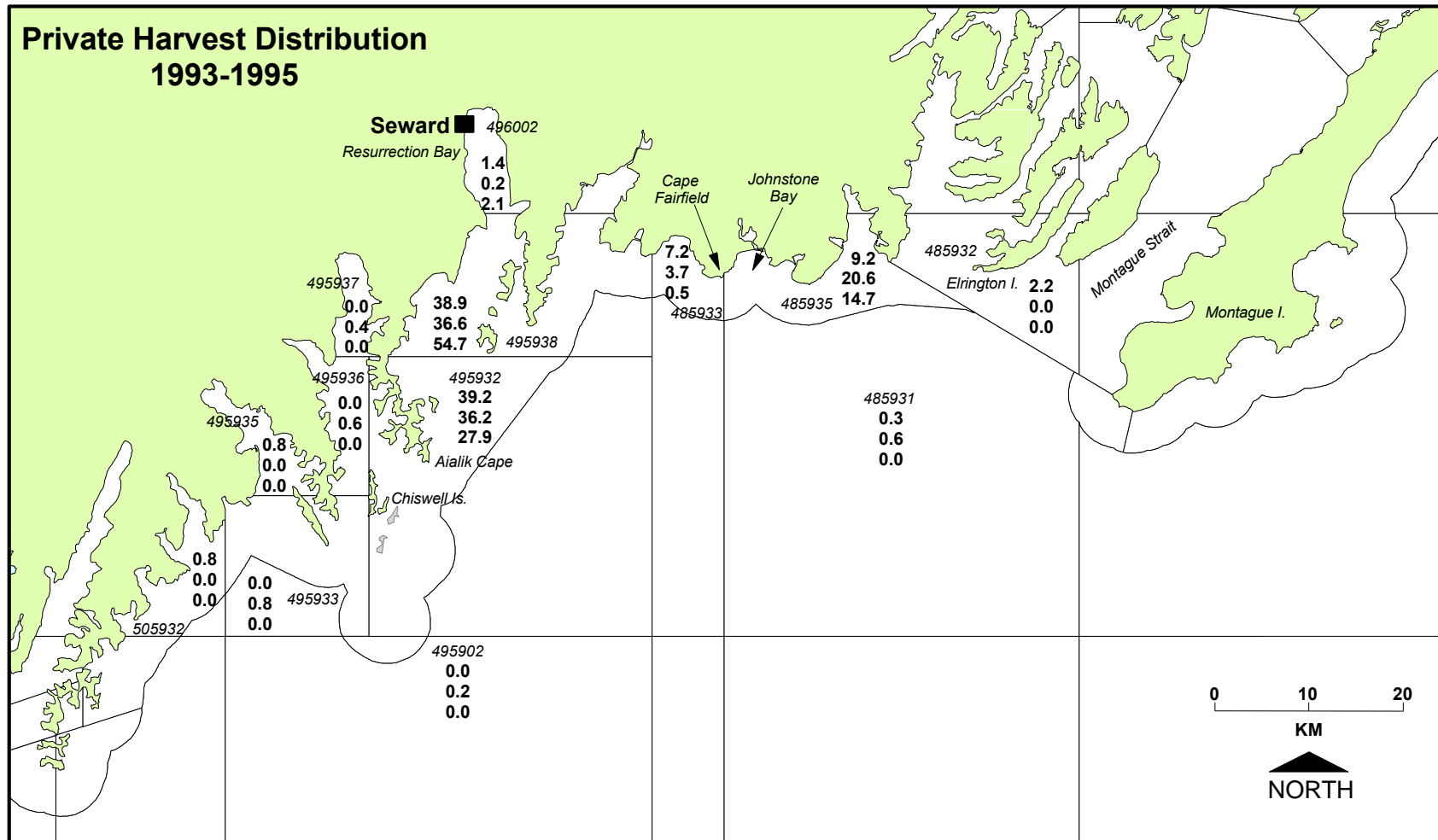
Note: The bold numbers in each ADF&G statistical area represent the percentage of total angler-days reported fishing in 1992 (top) through 1995 (bottom). Statistical areas without numbers had no effort reported by interviewed anglers.

Figure 31.-Spatial distribution of recreational effort for bottomfish by private anglers interviewed at Seward, 1992-1995.



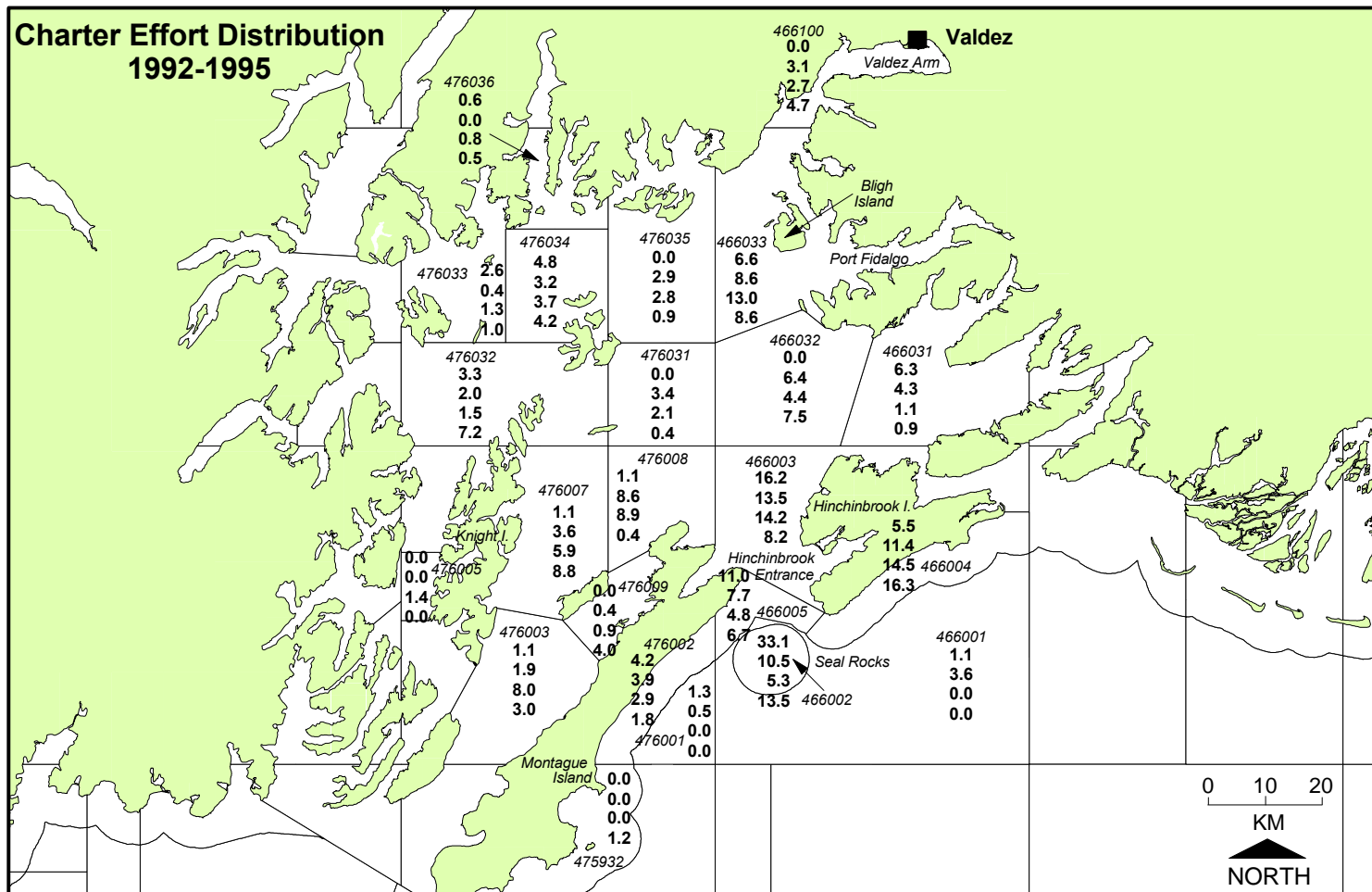
Note: The bold numbers in each ADF&G statistical area represent the percentage of the number of fish reported harvested in 1993 (top) through 1995 (bottom). Statistical areas without numbers had no reported harvest by interviewed anglers.

Figure 32.-Spatial distribution of the recreational rockfish harvest (all species) by charter anglers interviewed at Seward, 1993-1995.



Note: The bold numbers in each ADF&G statistical area represent the percentage of the number of fish reported harvested in 1993 (top) through 1995 (bottom). Statistical areas without numbers had no reported harvest by interviewed anglers.

Figure 33.-Spatial distribution of the recreational rockfish harvest (all species) by private anglers interviewed at Seward, 1993-1995.



Note: The bold numbers in each ADF&G statistical area represent the percentage of total angler-days reported fishing in 1992 (top) through 1995 (bottom). Statistical areas without numbers had no effort reported by interviewed anglers.

Figure 34.-Spatial distribution of recreational effort for bottomfish by charter anglers interviewed at Valdez, 1992-1995.

Hinchinbrook Island, Seal Rocks, and Hinchinbrook Entrance. Seal Rocks are approximately 120 km from Valdez. Private effort was also dispersed over a large area, but more than half of the private effort was in stat areas 466100 and 466033 in the extreme northeast corner of the sound (Figure 35). A significant proportion of the private effort extended into eastern Prince William Sound (466031) and to Hinchinbrook Entrance and the outer coast. This was surprising given the distance, high cost of fuel, and exposure to rough water, and the fact that private boats are usually smaller than charter vessels.

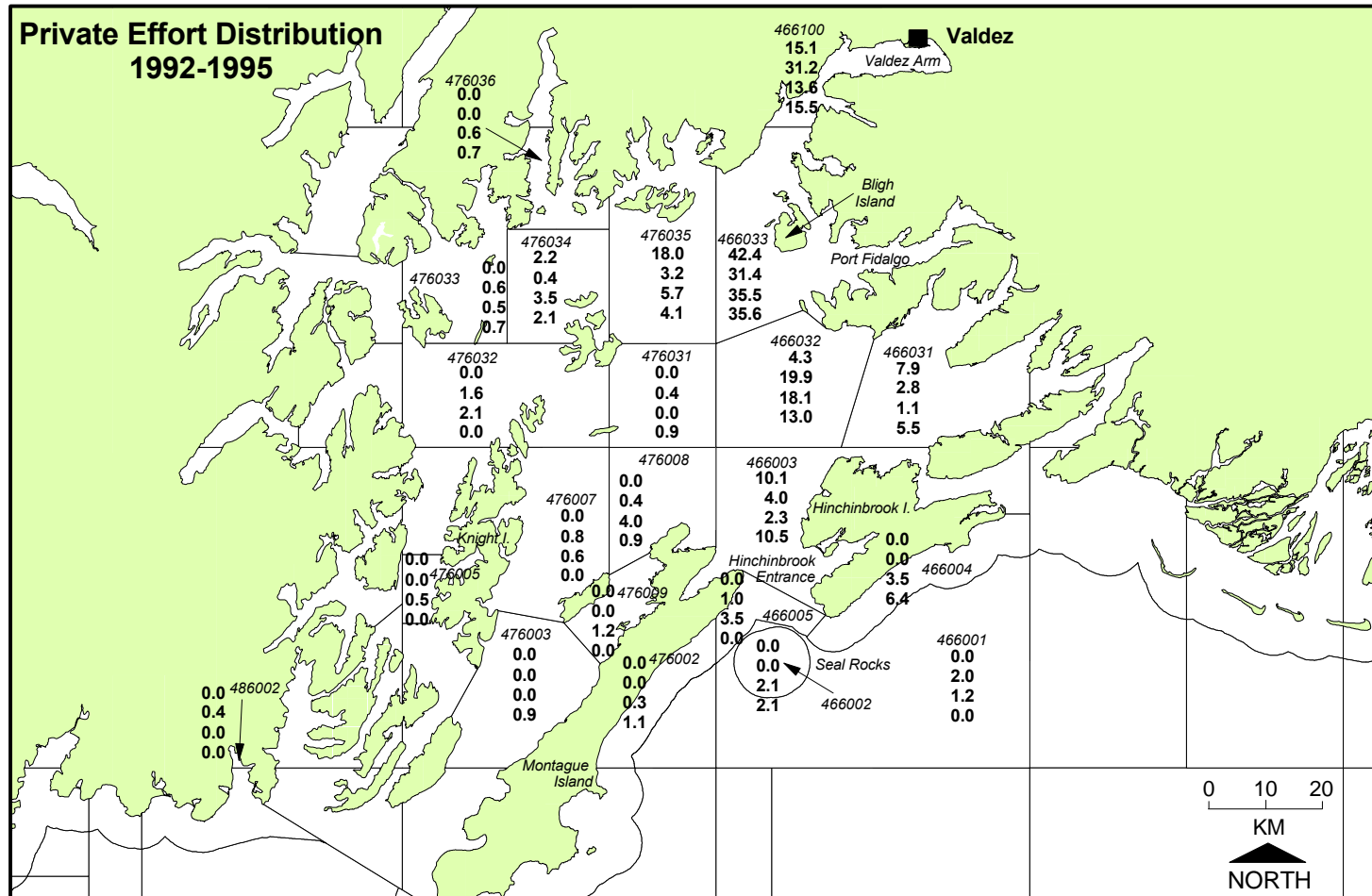
Rockfish harvest information was not collected during interviews in 1992. From 1993 to 1995, however, interviewed anglers harvested from 453 to 631 rockfish annually (Appendix B14). Rockfish harvest by charter anglers was more widely dispersed than their effort. Some single stat areas around Hinchinbrook Entrance accounted for a significant portion of the charter harvest in selected years. For example, the Seal Rocks area (466002) accounted for 24% of the harvest in 1993, while the outside waters off Hinchinbrook Island (466004) accounted for 32% in 1995 (Figure 36). Charter rockfish harvest was consistently high relative to effort in stat area 476007 off the east side of Knight Island. Rockfish harvest by private anglers was concentrated in waters from Valdez Arm to Bligh Island and Port Fidalgo (stat areas 466100 and 466003). About 13% of the private rockfish harvest was taken from the outer coast of Hinchinbrook Island in 1994 (Figure 37). In most years, however, the proportion of rockfish harvest taken by private anglers around Hinchinbrook Entrance is low relative to effort, suggesting that most private vessels fishing there are targeting halibut.

AVERAGE WEIGHT AND SPORT HARVEST BIOMASS

Length-weight regression parameters were estimated for black, dusky, and yelloweye rockfish, and for each management assemblage (Table 8). Estimated mean round weights ranged from about 1.7 to 2.6 kg for black rockfish, 1.0-1.5 for dusky rockfish, and 2.5-4.6 kg for yelloweye rockfish among all ports and years (Table 9). The allometric growth model provided reasonable fit to the observed weights for black and dusky rockfish (Figure 38). Although yelloweye rockfish accounted for much of the demersal rockfish data, the model still gave a good fit to the remaining demersal species. Unlike other species, variance of the slope rockfish estimated weights did not appear to increase with increasing length, but this may have been due to small sample sizes for most species.

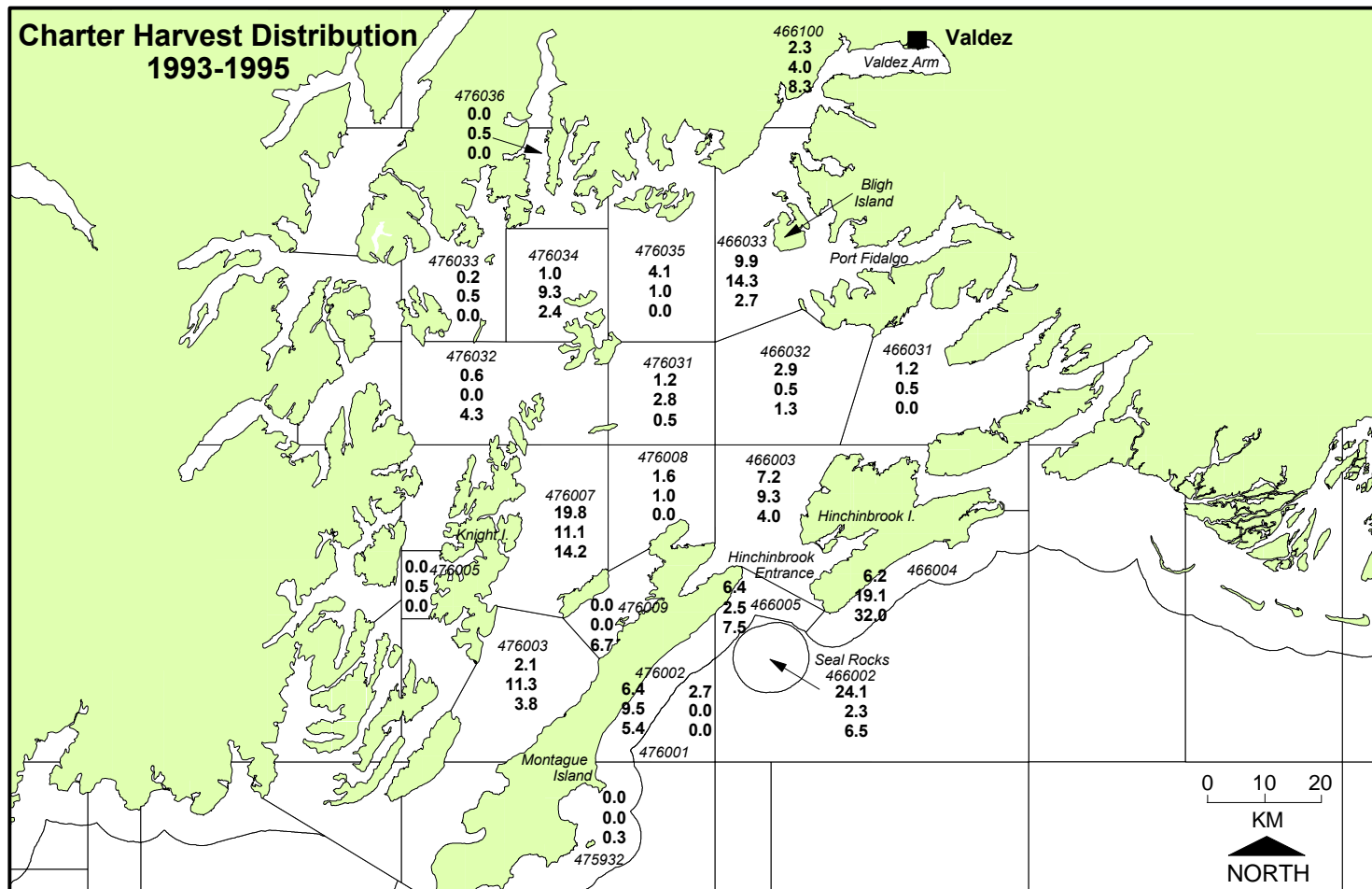
Estimates of the total recreational harvest biomass for all species combined ranged from about 95 to 116 mt over the period 1992-1995 (Table 10). Some of the estimates of SE (harvest biomass) are known to be biased low by a negligible amount. This bias resulted only when the variance of the mean weight for a particular species could not be estimated because it was based on a sample size of one fish (Appendix B15). In the worst instance (Homer, 1995), two species had sample sizes of one fish, but these two fish accounted for only 0.4% of the total harvest biomass for that port and year.

No sampling was done in Kodiak in 1991, but the mean weight for all species combined was likely about 1.7 kg. This assumption is based on the narrow range in estimated mean weight (1.65-1.76 kg) during the period 1992-1995, and the observation that pelagic species consistently comprised most of the harvest. Using this assumed mean weight, the 1991 Kodiak/Afognak subarea harvest biomass would have been about 14 mt, and the total over all subareas would have been about 84 mt.



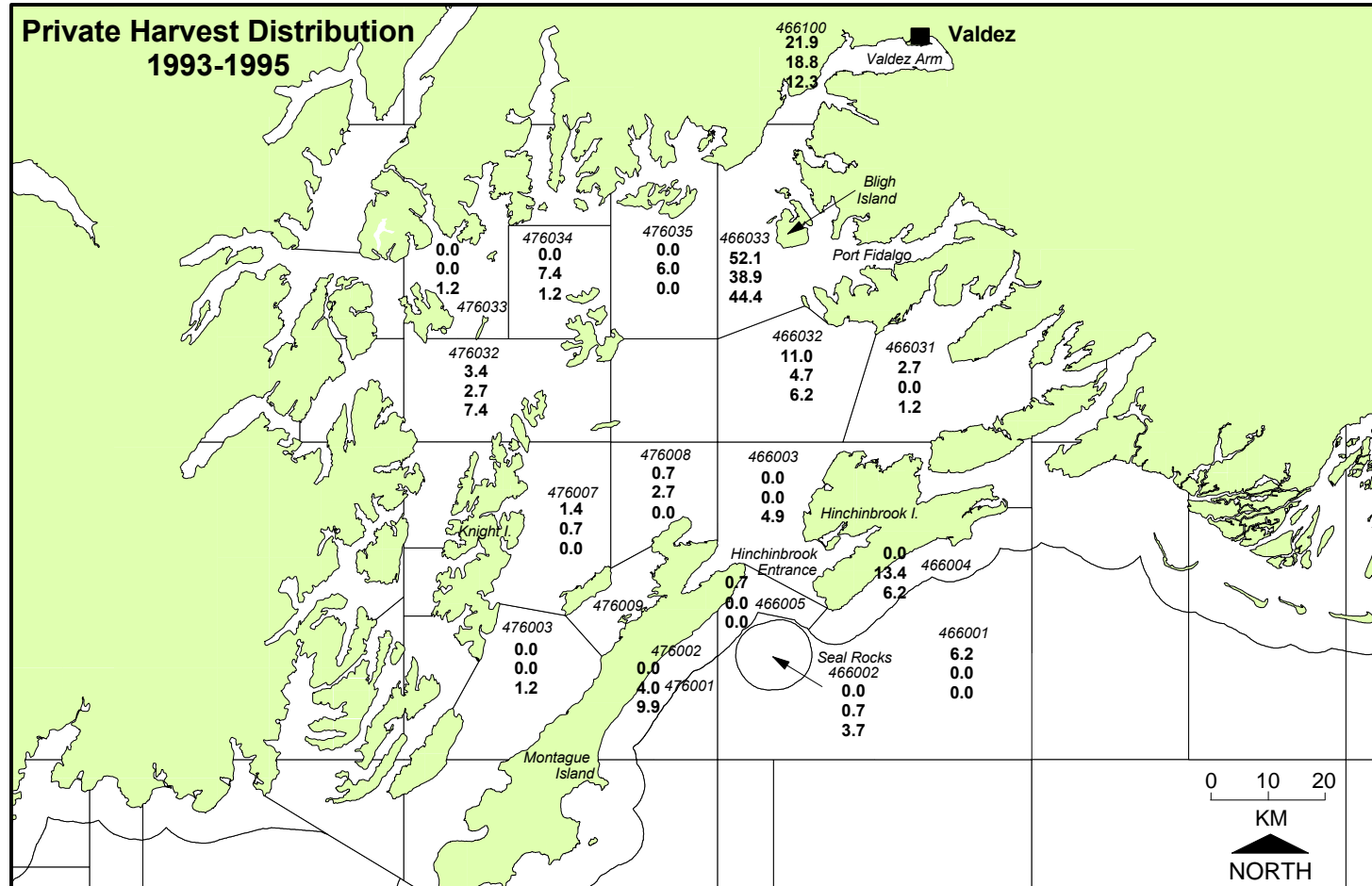
Note: The bold numbers in each ADF&G statistical area represent the percentage of total angler-days reported fishing in 1992 (top) through 1995 (bottom). Statistical areas without numbers had no effort reported by interviewed anglers.

Figure 35.-Spatial distribution of recreational effort for bottomfish by private anglers interviewed at Valdez, 1992-1995.



Note: The bold numbers in each ADF&G statistical area represent the percentage of the number of fish reported harvested in 1993 (top) through 1995 (bottom). Statistical areas without numbers had no reported harvest by interviewed anglers.

Figure 36.-Spatial distribution of the recreational rockfish harvest (all species) by charter anglers interviewed at Valdez, 1993-1995.



Note: The bold numbers in each ADF&G statistical area represent the percentage of the number of fish reported harvested in 1993 (top) through 1995 (bottom). Statistical areas without numbers had no reported harvest by interviewed anglers.

Figure 37.-Spatial distribution of the recreational rockfish harvest (all species) by private anglers interviewed at Valdez, 1993-1995.

Table 8.-Parameters of regression of log weight (kg) on log length (cm) for three rockfish species and management assemblages.

Species/Assemblage	n	Intercept	SE (Intercept)	Slope	SE (Slope)	MSE
By Species:						
Black	998	-4.6150	0.0678	2.9045	0.0404	0.0031
Dusky	145	-4.1936	0.1931	2.6487	0.1196	0.0067
Yelloweye	336	-4.7657	0.0934	3.0153	0.0535	0.0042
By Assemblage:						
Pelagic	1,152	-4.5170	0.0587	2.8462	0.0352	0.0036
Demersal	528	-4.7457	0.0542	3.0042	0.0320	0.0052
Slope	46	-4.5809	0.2822	2.8029	0.1683	0.0087

Note: The intercept = log a, and the slope = b, where a and b are parameters of the allometric growth model (equation 3). MSE is the mean squared error of the regression.

There appeared to be some redistribution of harvest among the subareas during the period 1991-1995. As the portion of the total harvest biomass accounted for by the North Gulf subarea declined from 63% to 37%, the Prince William Sound subarea portion increased from 25% to 42%. Harvest biomass in the other two areas remained relatively stable.

As was the case with numerical species composition, black and dusky rockfish accounted for the majority of the harvest biomass at Kodiak; black, dusky, and yelloweye rockfish accounted for the majority at Homer; and black and yelloweye rockfish accounted for the majority at Seward and Valdez (Figure 39). Summarizing at an assemblage level, pelagic species dominated the harvest biomass at Kodiak and Seward, while demersal species dominated at Homer and Valdez (Figure 40). Slope species comprised a negligible portion of the harvest biomass at all ports.

The relative precision (95% confidence) of harvest biomass estimates for any port and year ranged from 11% to 30%. Estimates for the North Gulf subarea were most precise, ranging from 11% to 17%. The relative precision of the total harvest biomass for all sampled areas ranged from 8% to 10%.

Data files and computer programs used to produce this report are listed in Appendix C1.

DISCUSSION

INFERENCES, ACCURACY, AND ASSUMPTIONS

This ongoing assessment program provides basic statistics on the primary rockfishes harvested in the recreational fishery over quite a large area. It should be emphasized that estimates in this report pertain only to landed harvest, and inferences from these data to the rockfish population

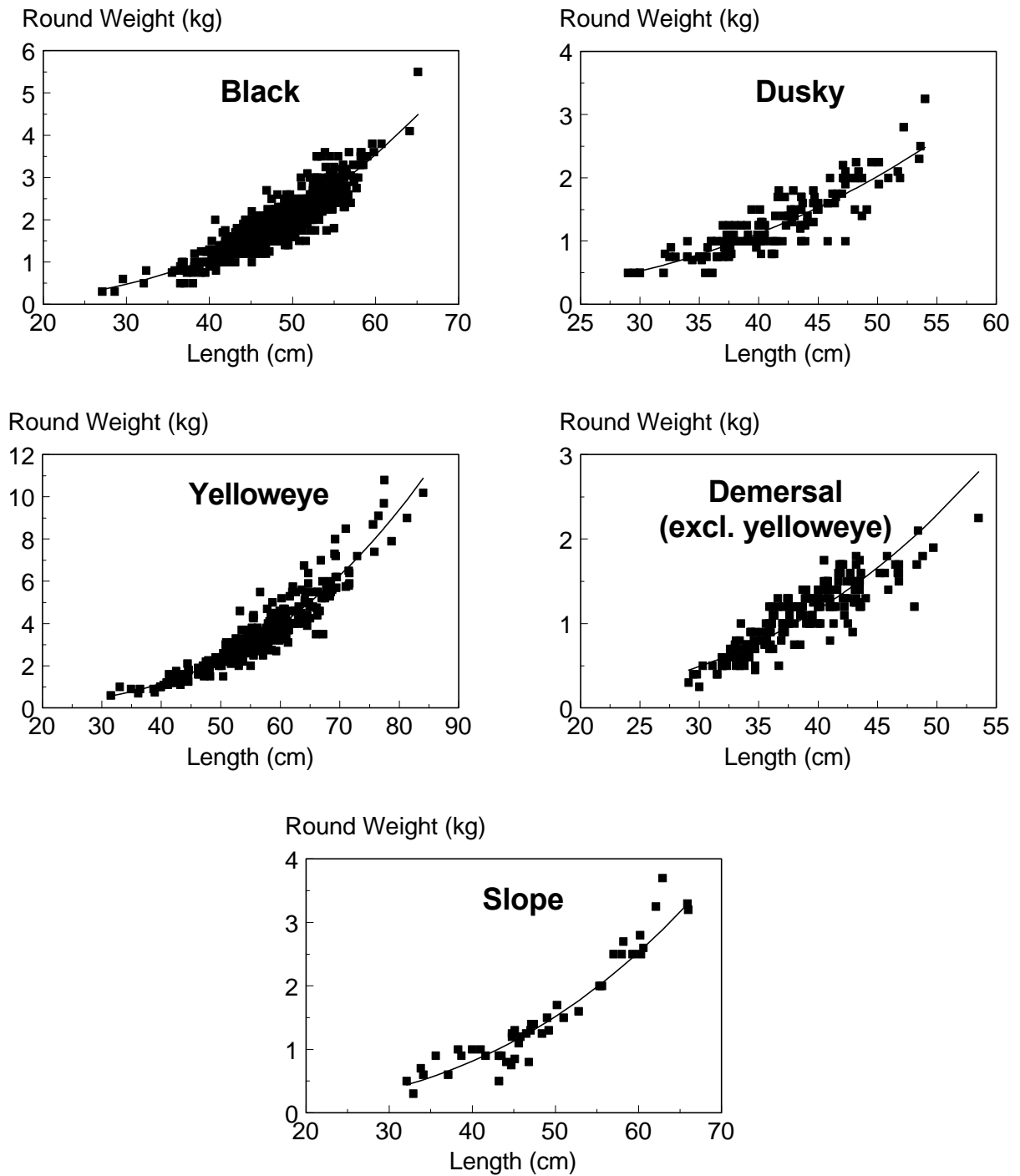
require broader and riskier assumptions. For example, species composition of the sport harvest is likely very different from the species composition of the population. Most rockfish harvested in the sport fishery are taken in relatively shallow waters. The sport fishery for halibut and other groundfish is generally concentrated in waters less than 90 meters (or about 50 fathoms), and in most cases is even shallower. This effectively limits harvest to shallow pelagic and demersal shelf species. Pelagic rockfish are often intercepted while lowering the bait or while fishing for salmon at mid-depths. The only slope species caught with any regularity was silvergray rockfish, which has a relatively shallow depth distribution compared to many other slope species (Kramer and O'Connell 1995). There are also species-specific differences in vulnerability to

Table 9.-Estimated mean round weight (kg), standard error, and sample size of black, dusky, and yelloweye rockfish harvested in recreational fisheries in Southcentral Alaska, 1991-1995.

Port	Year	Black Rockfish			Dusky Rockfish			Yelloweye Rockfish		
		Mean	SE	n	Mean	SE	n	Mean	SE	n
Kodiak	1991	^a								
	1992	1.76	0.03	294	1.29	0.05	115	^a		5
	1993	1.68	0.01	867	1.40	0.03	174	^a		8
	1994	1.86	0.02	366	1.44	0.03	136	^a		6
	1995	1.70	0.03	313	1.26	0.04	100	^a		17
Homer	1991	2.05	0.05	137	0.95	0.05	28	4.02	0.10	237
	1992	1.85	0.04	247	1.01	0.02	311	3.67	0.09	259
	1993	2.13	0.03	184	1.23	0.04	103	4.41	0.10	234
	1994	2.14	0.04	146	1.04	0.03	94	3.68	0.12	155
	1995	2.23	0.04	67	1.13	0.07	30	4.60	0.20	55
Seward	1991	1.92	0.02	1,126	1.23	0.07	22	3.59	0.08	384
	1992	1.72	0.01	1,783	1.13	0.04	47	3.64	0.08	362
	1993	1.81	0.02	684	1.08	0.02	136	3.21	0.08	230
	1994	1.78	0.02	714	1.31	0.11	28	3.87	0.14	147
	1995	1.89	0.02	608	1.06	0.03	54	3.39	0.08	325
Valdez	1991	2.31	0.03	315	1.47	0.11	25	2.50	0.07	300
	1992	2.52	0.03	394	^a		6	2.87	0.09	381
	1993	2.48	0.05	157	^a		10	3.13	0.07	522
	1994	2.43	0.05	105	^a		1	2.68	0.10	124
	1995	2.58	0.05	68	^a		3	3.35	0.14	86

Note: Estimates are not presented for sample sizes less than 20 fish.

^a No estimate because there was no sampling to estimate mean weight.



Note: See Table 8 for regression parameters.

Figure 38.-Observed length-weight data and fitted curves, by species, for rockfish harvested in Southcentral Alaska, 1991-1995.

Table 10.-Estimated recreational rockfish harvest biomass (mt) for all species combined, by subarea and year, in Southcentral Alaska during 1991-1995.

Year	Estimate	Subarea				Grand Total
		Kodiak/ Afognak	Cook Inlet	North Gulf	Prince William Sound	
1991	Biomass	^a	8.7	44.6	17.3	
	SE (Biomass)		1.2	3.0	1.6	
1992	Biomass	9.4	9.3	56.8	36.6	112.1
	SE (Biomass)	1.4	0.8	3.1	2.8	4.4
1993	Biomass	12.5	14.6	48.3	31.6	107.0
	SE (Biomass)	1.9	1.6	3.2	3.4	5.3
1994	Biomass	8.9	12.7	57.3	36.6	115.5
	SE (Biomass)	1.0	1.1	3.3	3.1	4.8
1995	Biomass	7.4	12.4	35.4	39.4	94.6
	SE (Biomass)	1.0	1.5	3.0	3.6	5.0

^a No estimate because there was no sampling to estimate mean weight.

sport gear that are based on fish behavior. For example, "secretive" demersal species, such as China rockfish, may be in close proximity to gear but less vulnerable because of behavioral traits.

Some of the estimates were assumed to be representative of areas outside the sampled port, but these assumptions certainly pose risks of bias. For example, estimates of species composition of the harvest landed at Homer may not be representative of the entire Cook Inlet harvest because there were numerous unsampled access points along the south side of Kachemak Bay. The winter chinook salmon fishery in Cook Inlet produces an incidental harvest of mostly pelagic rockfish that are not accounted for in summer sampling. Likewise, in Prince William Sound the species composition of rockfish landed at Valdez may be very different from harvest landed at Whittier, Cordova, or Seward. Most rockfish landed and sampled at Kodiak were taken from Chiniak Bay or nearby waters, and there are no data from waters around the remainder of the Kodiak and Afognak islands. Seward is the only access point in the North Gulf fishery, but the Seward fleet also ventures into waters of Prince William Sound.

Estimates that merge data from harvest sampling and the Statewide Sport Fish Harvest Survey (Mills 1992-1994, Howe et al. 1995-1996), such as estimates of harvest biomass, are subject to biases inherent in postal survey estimates of the number of fish harvested. These estimates are believed by staff to be inflated for rockfish because of misidentification. This belief is based in part on the observation that many anglers cannot correctly identify marine fishes and often refer to sculpins or greenling as rockfish. Onsite sampling occasionally reveals a significant discrepancy between postal survey estimates and personal observations. For example, postal

Harvest Biomass (mt)

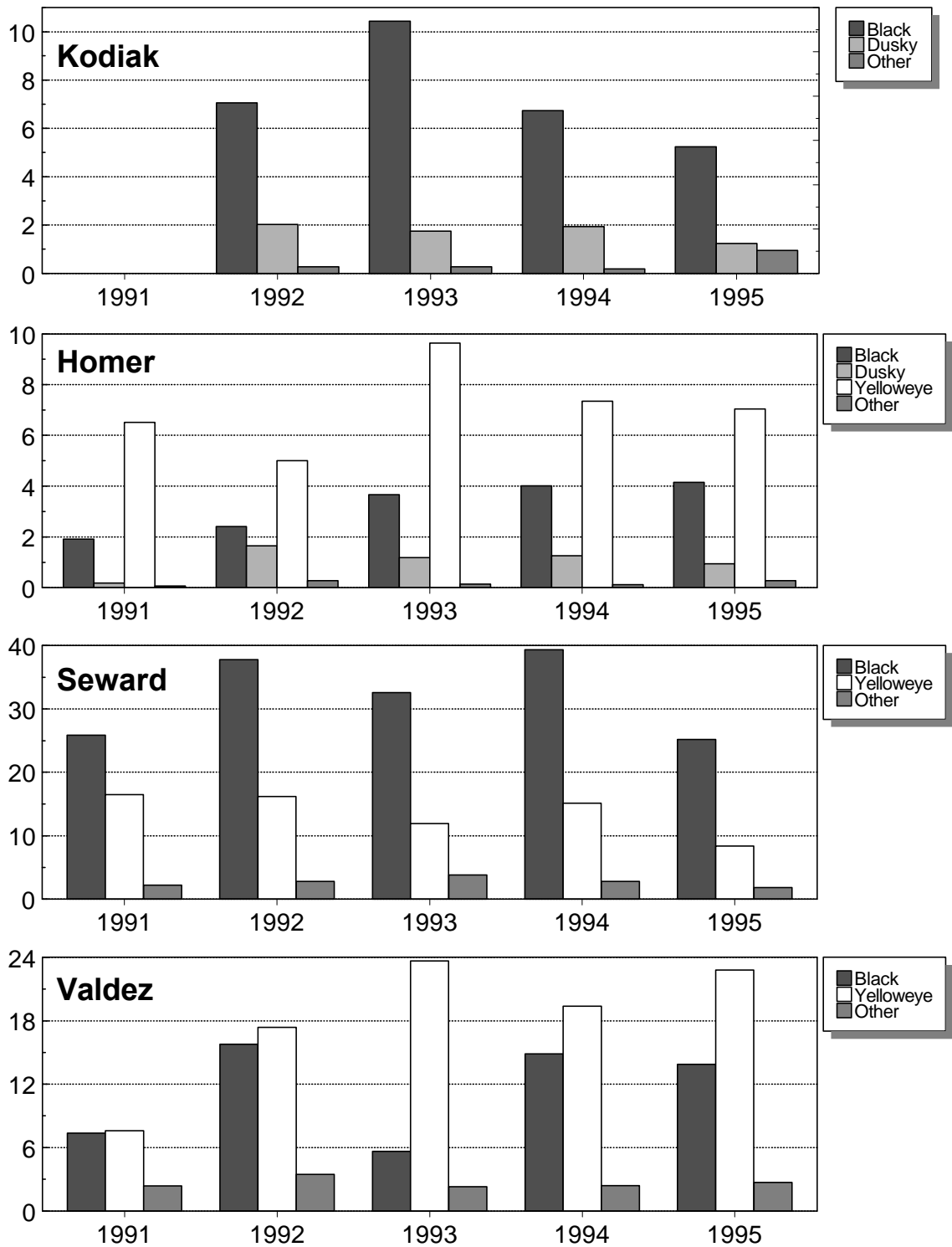


Figure 39.-Southcentral Alaska recreational rockfish harvest biomass, by species and subarea, 1991-1995.

Harvest Biomass (mt)

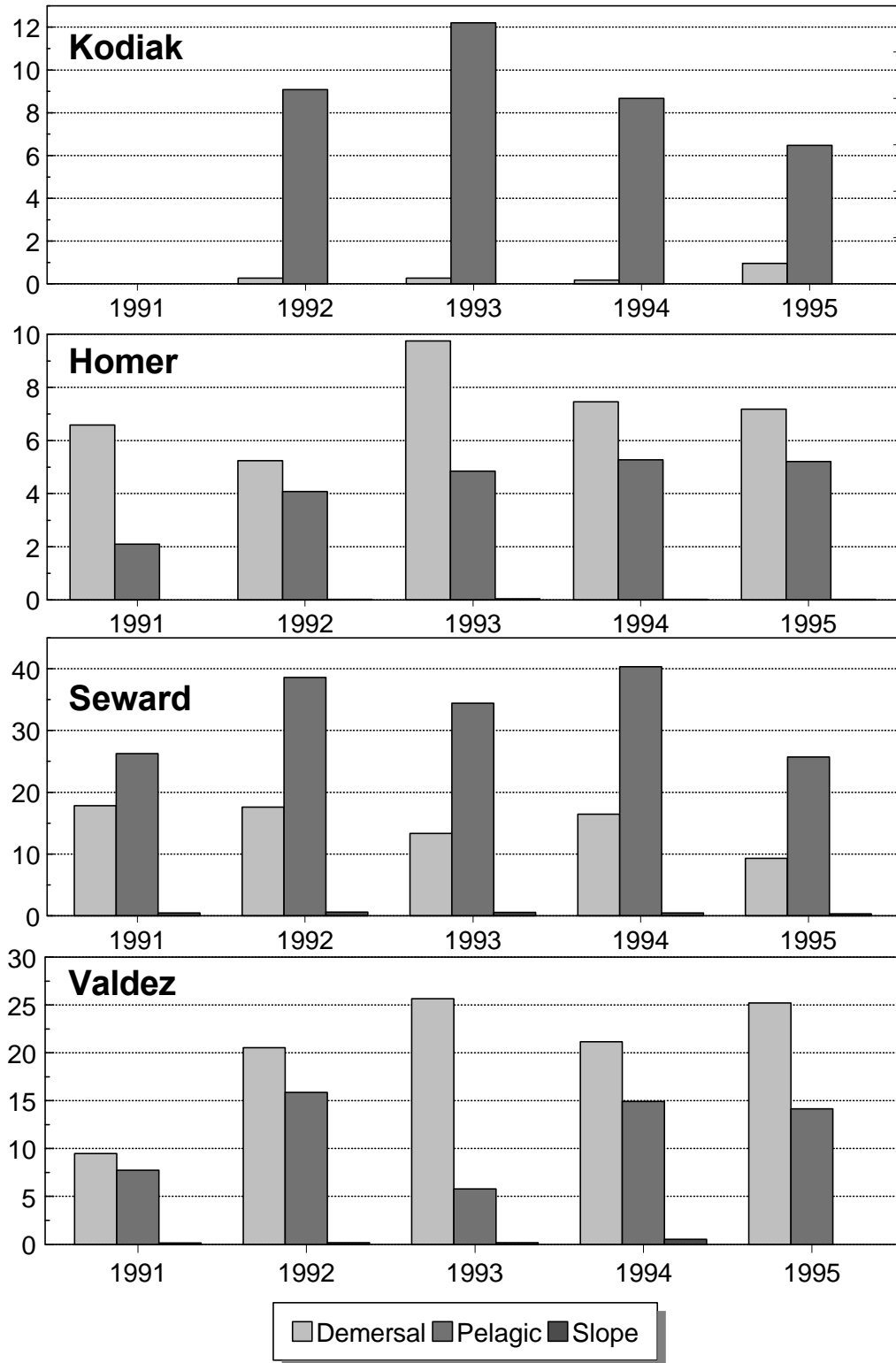


Figure 40.-Southcentral Alaska recreational rockfish harvest biomass, by management assemblage and subarea, 1991-1995.

survey estimates of rockfish harvest in Cook Inlet north of Anchor Point ranged from 240 to 961 during the period 1991-1995 (Mills 1992-1994, Howe et al. 1995, 1996), but department staff never observed a rockfish in the harvest during May-August sampling of the sport halibut harvest in 1991, 1994, or 1995. There is no significant fishery outside of the summer months.

There is also variation in where anglers report their harvest in the Sport Fish Harvest Survey. Some anglers provide detailed locations but most report general locations such as the site most closely associated with the port of landing. This can pose problems where fleets overlap. For example, some of the anglers that fished in Prince William Sound but landed their catch in Seward could have reported the fishing site as either Prince William Sound or Resurrection Bay. No attempt was made to correct for this because there was no way to know the degree of misreporting in the Sport Fish Harvest Survey. Even if known, partitioning the average weight estimates from this study based on distribution of harvest estimated from interviews would have resulted in sample sizes too small to produce reliable estimates. Given the potential for geographic mismatches of harvest estimates from the postal survey and average weight estimates from port sampling, the accuracy of the harvest biomass estimates is compromised. The estimates are based on the best use of available data, however, and were probably fairly accurate for most areas because average weights did not vary greatly between locations or years.

Because rockfish sampling is part of a larger overall program, and because there are conflicting sampling demands, sample sizes for minor species were too small to adequately detect relative changes in characteristics such as species or age composition. For example, uncommon species generally made up a lower proportion of the harvest than the objective criteria for precision. Without estimates of abundance or a better understanding of species selectivity of the sport fishery, it is difficult to assess whether these low levels of harvest pose risks for populations of these species.

To summarize, there is a considerable amount of uncertainty in the estimates of sport harvest biomass due to cumulative errors in estimation, misreporting and misidentification of fish, and assumptions about how well data from sampled ports represent each subarea. Given this uncertainty, the estimates should be considered approximate, with more emphasis put on trend than magnitude.

LONGEVITY

For eight species, the maximum ages noted in this report were substantially greater than the maximum ages reported previously from Southcentral Alaska (Meyer 1992). This was probably due primarily to larger cumulative sample sizes. The confirmation of extreme longevity in several of the species underscores the need for conservative management.

Two black rockfish were assigned an age of 50 years. This was close to the maximum of 48 reported by Urban and Phillips (1994). These fish were looked at by an independent ager in a blind comparison and assigned ages of 44 and 48. A third reader assigned ages of 49 and 51 (not a blind reading). The amount of variation in assigned ages was larger for these individual fish than for the "typical" black rockfish, but probably not biologically significant.

The maximum assigned age of 67 years for a dusky rockfish is substantially higher than the maximum age of 59 reported by Clausen and Heifetz (1996). They suggested that because the 59-year-old fish was 10 years older than the previous maximum age of 49 that it should be viewed with caution. This study, however, collected 31 dusky rockfish with assigned ages of at least 40 years, including one of 55 years and another of 61 years. The 61 and 67-year-old fish

were assigned ages of 65 and 67 years by an independent ager (blind comparison), lending credibility to Clausen and Heifetz's (1996) original observation. Most of the oldest dusky rockfish were collected at Homer or Kodiak during 1992 and 1993.

AGE COMPOSITION

The observed variability in relative strengths of age groups was not unusual or unexpected. Strong variation in year classes has already been documented in many species including, for example, black rockfish (Urban and Phillips 1994), dusky rockfish (Clausen and Heifetz 1996), and yelloweye rockfish (O'Connell et al. 1997). The true variability may have been even greater than observed, for errors in assigning ages cause underestimation of strong year classes and overestimation of weak ones (Kimura and Lyons 1991).

As noted in the results, there appeared to be a consistent yet minor error in black rockfish aging due to changes in readers. In particular, strong cohorts at Homer and Kodiak did not advance one year between 1993 and 1994 (Figure 5). The 1993 Kodiak age composition was almost identical to age composition of the commercial harvest in Kodiak (Urban and Phillips 1994) but consistently one year higher. Strong age classes of 8, 12, 14, and 17 years in the commercial harvest corresponded with peaks in the sport harvest at 9, 13, 15, and 18 years. A new rockfish ager employed in 1994 deliberately ignored a possible annulus located near the nucleus based on results of an otolith exchange with the ADF&G Juneau lab. This should have made ages assigned after 1993 consistent with ages assigned to commercial samples.

A visual comparison of differences among ports (Figure 5) suggests that factors affecting black rockfish age composition are similar in Kodiak and Homer, and quite different from Seward or Valdez. Kodiak and Homer harvests appear to include occasional strong age classes between 5 and 10 years. Black rockfish do not appear in the Seward harvest in any significant number until about age 9, and not until about age 12 at Valdez. The relatively young mode in the Seward harvest (10-12 years) is possibly a result of higher exploitation, as this area has a long history of relatively heavy sport and commercial harvest.

Another feature in most black rockfish age composition estimates is that the right-hand sides of the distributions appear truncated. Although older fish are present in small numbers, the proportions appear to decrease faster than expected given the observed maximum ages. With relatively no growth after the age of maturity, it could be assumed that the natural mortality rate of mature fish is relatively constant. This may be an indicator of long-term growth overfishing, which is consistent with some anecdotal reports by long-time sport and commercial fishermen that abundance of black rockfish is much lower than historical levels.

RECOMMENDATIONS

Small sample sizes will continue to be a problem for some species, as rockfish data are collected along with data on other sport-harvested species. Efforts should be made to utilize more efficient sampling designs, such as adaptive sampling, that allow greater sample sizes without jeopardizing sampling objectives for other species.

Release mortality will continue to be an obstacle for successful rockfish management. A better understanding of the factors affecting rockfish bycatch in sport fisheries for halibut and salmon is needed. Estimates of the mortality rates of released fish could provide better estimates of total rockfish removals. A side benefit of this research might be improved techniques for releasing rockfish with inflated swim bladders.

Turnover in age readers will continue to be an unfortunate reality. To the extent practical, efforts should be made to reduce variability in assigned ages between and within readers. Some success in this area was probably gained in recent years by baking, rather than burning, otoliths. Baking produced a less dense edge, reducing variation in assigned ages of yelloweye rockfish (Meyer 1998). Continued exchanges with independent labs would resolve differences in interpretation that arise with new readers. Research into age and growth of juvenile rockfish might resolve issues with identification of the first annulus.

This report cannot, and was not intended to, serve as an assessment of the status of rockfish stocks. Much of the information for age-based assessments is unavailable, including extended time series of age composition data for sport and commercial removals, and indices of abundance from fishery-independent sampling programs. There is, however, a substantial amount of ancillary data on the magnitude of sport and commercial removals, growth rates, maturity, and natural mortality that have not yet been analyzed or published. A synthesis of these data for primary species in the harvest would improve understanding of the fishery and the stocks, and may allow a less rigorous yet useful assessment of stock status. At a minimum, it would serve to outline critical data needs.

While an assessment of the status of stocks is a critical need, managers and users of the resource need to realize that a "classic" stock assessment, with recommendations on sustainable levels of effort or harvest, may never be possible for any rockfish stocks in the northern Gulf of Alaska. In addition to the difficulties imposed by the inherent biological characteristics of rockfish, there is a trend of reduced government spending for groundfish assessment. Most recreational harvest is taken incidental to fishing for halibut and the exvessel value of the commercial harvest is relatively low among state-managed fisheries. Even if managers could define a sustainable harvest, implementation of harvest controls would be troublesome given the problem of decompression injury.

Marine refuges, areas closed to all fishing for all species, are increasingly being considered as valuable tools to augment more traditional management. Documented and potential benefits of reserves include maintenance of ecosystem biodiversity, provision for recovery of fish in overexploited areas, protection of a portion of fish stocks from genetic and other effects of fishery selectivity, dispersal of larvae and adults to areas outside the reserve boundary, protection of habitat, insurance against management failures, and improved understanding of environmental versus fishery effects (Vincent-Lang 1995, pp. 61-64; UBCFC 1997; NOAA 1998; Murray et al. 1999). The state should actively pursue establishment of a marine reserve network for long-term sustainability of nearshore sport and commercial fisheries. The primary considerations when establishing marine reserves are: (1) number, (2) size, (3) location, and (4) enforcement. The science needed to address each of these design issues need not, and likely will not, be complete before reserves are established. The regulatory framework should therefore be flexible enough to allow modification of reserve boundaries as additional information comes available (Murray et al. 1999).

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APPENDIX A. SPORT FISH SURVEY HARVEST ESTIMATES

Appendix A1.-Estimated recreational rockfish harvest (number of fish) for all species combined, by subarea and year, in Southcentral Alaska during 1991-1995.

Year	Estimate	Subarea				Grand Total
		Kodiak/ Afognak	Cook Inlet	North Gulf	Prince William Sound	
1991	Harvest	8,036	2,819	19,803	8,733	39,391
	SE (Harvest)	1,861	459	1,850	1,228	2,933
1992	Harvest	5,652	4,537	28,729	15,478	54,396
	SE (Harvest)	938	547	2,034	1,712	2,872
1993	Harvest	7,569	4,993	24,978	12,274	49,814
	SE (Harvest)	1,357	696	2,093	1,635	3,063
1994	Harvest	5,019	5,184	28,256	15,382	53,841
	SE (Harvest)	714	594	1,965	1,522	2,653
1995	Harvest	4,247	4,399	17,360	14,701	40,707
	SE (Harvest)	713	599	1,880	1,419	2,533

Note: Point estimates are from Mills (1992, 1993, 1994) and Howe et al. (1995, 1996). Standard errors were provided by G. Heineman, ADF&G Sport Fish Division, Policy and Technical Services (unpublished estimates).

APPENDIX B. DETAILED DATA TABLES

Appendix B1.-Numbers of rockfish sampled for biological characteristics from the recreational harvest at Kodiak, Homer, Seward, and Valdez, 1992-1995.

Species	Kodiak				Homer				Seward				Valdez				Total			
	1992	1993	1994	1995	1992	1993	1994	1995	1992	1993	1994	1995	1992	1993	1994	1995	1992	1993	1994	1995
Black	294	867	366	313	247	184	146	67	1,783	684	714	608	394	157	105	68	2,718	1,892	1,331	1,056
Bocaccio	0	0	0	0	0	0	0	1	5	5	1	0	0	3	0	0	5	8	1	1
Canary	0	0	0	0	20	2	3	2	31	31	12	20	3	0	0	0	54	33	15	22
China	0	0	0	0	8	2	0	1	35	32	11	34	0	3	8	1	43	37	19	36
Copper	0	0	0	0	1	2	0	0	20	13	8	26	53	61	5	10	74	76	13	36
Dusky	115	174	136	100	311	103	94	30	47	136	28	54	6	10	1	3	479	423	259	187
Northern	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0
Quillback	0	0	0	0	5	0	0	0	79	66	28	96	120	82	14	18	204	148	42	114
Rosethorn	0	0	0	0	0	0	0	0	2	1	1	0	0	0	0	0	2	1	1	0
Rougheye	0	0	0	0	2	4	0	0	7	1	0	0	2	0	0	0	11	5	0	0
Redstripe	0	0	0	0	0	0	0	0	3	2	5	2	0	0	0	0	3	2	5	2
Silvergray	0	0	0	0	0	0	0	0	53	34	23	44	12	6	7	0	65	40	30	44
Shortraker	0	0	0	0	3	0	1	0	0	0	0	0	0	0	0	0	3	0	1	0
Tiger	0	0	0	1	2	3	4	0	23	16	14	16	2	1	0	0	27	20	18	17
Widow	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
Yelloweye	5	8	6	17	259	234	155	55	362	230	147	325	381	522	124	86	1,007	994	432	483
Yellowtail	0	1	0	0	0	0	0	2	25	21	4	10	0	0	0	0	25	22	4	12
Unknown	0	3	0	0	0	0		0	0	0	0	0	1	0	0	0	1	3	0	0
Totals	414	1,053	508	431	860	534	403	158	2,475	1,272	996	1,235	974	846	264	186	4,723	3,705	2,171	2,010

Appendix B2.-Species composition of rockfishes in the recreational harvest from major Southcentral Alaska ports, 1992-1995 (n = number of fish, p = proportion, SE (p) = standard error of the proportion).

Port and Species	1992			1993			1994			1995		
	n	p	SE (p)	n	p	SE (p)	n	p	SE (p)	n	p	SE (p)
Kodiak												
Black	294	0.710	0.022	867	0.823	0.012	366	0.720	0.020	313	0.726	0.022
Dusky	115	0.278	0.022	174	0.165	0.011	136	0.268	0.020	100	0.232	0.020
Tiger	0			0			0			1	0.002	0.002
Yelloweye	5	0.012	0.005	8	0.008	0.003	6	0.012	0.005	17	0.039	0.009
Yellowtail	0			1	0.001	0.001	0			0		
Unidentified Demersal	0			3	0.003	0.002	0			0		
Total	414			1,053			508			431		
Homer												
Black	247	0.287	0.015	184	0.345	0.021	146	0.362	0.024	67	0.424	0.039
Bocaccio	0			0			0			1	0.006	0.006
Canary	20	0.023	0.005	2	0.004	0.003	3	0.007	0.004	2	0.013	0.009
China	8	0.009	0.003	2	0.004	0.003	0			1	0.006	0.006
Copper	1	0.001	0.001	2	0.004	0.003	0			0		
Dusky	311	0.362	0.016	103	0.193	0.017	94	0.233	0.021	30	0.190	0.031
Quillback	5	0.006	0.003	0			0			0		
Rougheye	2	0.002	0.002	4	0.007	0.004	0			0		
Shortraker	3	0.003	0.002	0			1	0.002	0.002	0		
Tiger	2	0.002	0.002	3	0.006	0.003	4	0.010	0.005	0		
Widow	2	0.002	0.002	0			0			0		
Yelloweye	259	0.301	0.016	234	0.438	0.021	155	0.385	0.024	55	0.348	0.038
Yellowtail	0			0			0			2	0.013	0.009
Total	860			534			403			158		

-continued-

Appendix B2.-Page 2 of 2.

Port and Species	1992			1993			1994			1995		
	n	p	SE (p)	n	p	SE (p)	n	p	SE (p)	n	p	SE (p)
Seward												
Black	1,783	0.765	0.009	680	0.721	0.015	714	0.783	0.014	608	0.768	0.015
Bocaccio	3	0.001	0.001	1	0.001	0.001	0			0		
Canary	16	0.007	0.002	11	0.012	0.003	6	0.007	0.003	4	0.005	0.003
China	13	0.006	0.002	9	0.010	0.003	6	0.007	0.003	6	0.008	0.003
Copper	5	0.002	0.001	4	0.004	0.002	4	0.004	0.002	8	0.010	0.004
Dusky	39	0.017	0.003	58	0.062	0.008	24	0.026	0.005	17	0.021	0.005
Quillback	55	0.024	0.003	18	0.019	0.004	18	0.020	0.005	20	0.025	0.006
Rosethorn	1	0.000	0.000	0			0			0		
Rougheye	6	0.003	0.001	0			0			0		
Redstripe	1	0.000	0.000	0			0			0		
Silvergray	26	0.011	0.002	13	0.014	0.004	11	0.012	0.004	11	0.014	0.004
Tiger	9	0.004	0.001	5	0.005	0.002	3	0.003	0.002	1	0.001	0.001
Yelloweye	361	0.155	0.007	140	0.148	0.012	126	0.138	0.011	113	0.143	0.012
Yellowtail	13	0.006	0.002	4	0.004	0.002	0			4	0.005	0.003
Total	2,331			943			912			792		
Valdez												
Black	394	0.405	0.016	157	0.186	0.013	105	0.398	0.030	68	0.366	0.035
Bocaccio	0			3	0.004	0.002	0			0		
Canary	3	0.003	0.002	0			0			0		
China	0			3	0.004	0.002	8	0.030	0.011	1	0.005	0.005
Copper	53	0.054	0.007	61	0.072	0.009	5	0.019	0.008	10	0.054	0.017
Dusky	6	0.006	0.003	10	0.012	0.004	1	0.004	0.004	3	0.016	0.009
Northern	0			1	0.001	0.001	0			0		
Quillback	120	0.123	0.011	82	0.097	0.010	14	0.053	0.014	18	0.097	0.022
Rougheye	2	0.002	0.001	0			0			0		
Silvergray	12	0.012	0.004	6	0.007	0.003	7	0.027	0.010	0		
Tiger	2	0.002	0.001	1	0.001	0.001	0			0		
Unidentified Slope	1	0.001	0.001	0			0			0		
Yelloweye	381	0.391	0.016	522	0.617	0.017	124	0.470	0.031	86	0.462	0.037
Total	974			846			264			186		

Appendix B3.-Estimated age composition of the black rockfish sport harvest landed at Kodiak, Homer, Seward, and Valdez, 1992-1995.

Kodiak:

Age	1992				1993				1994				1995			
	n	p	SE (p)		n	p	SE (p)		n	p	SE (p)		n	p	SE (p)	
2	4	0.014	0.007		-	-	-		-	-	-		-	-	-	
3	4	0.014	0.007		-	-	-		-	-	-		-	-	-	
4	-	-	-		-	-	-		-	-	-		-	-	-	
5	-	-	-		-	-	-		5	0.016	0.007		7	0.025	0.009	
6	1	0.004	0.004		1	0.002	0.002		-	-	-		39	0.140	0.021	
7	14	0.050	0.013		-	-	-		-	-	-		3	0.011	0.006	
8	18	0.065	0.015		5	0.010	0.005		3	0.009	0.005		1	0.004	0.004	
9	10	0.036	0.011		52	0.109	0.014		13	0.041	0.011		14	0.050	0.013	
10	11	0.039	0.012		47	0.098	0.014		56	0.177	0.022		36	0.129	0.020	
11	20	0.072	0.015		14	0.029	0.008		29	0.092	0.016		21	0.076	0.016	
12	26	0.093	0.017		18	0.038	0.009		10	0.032	0.010		12	0.043	0.012	
13	61	0.219	0.025		61	0.127	0.015		23	0.073	0.015		13	0.047	0.013	
14	37	0.133	0.020		10	0.021	0.007		26	0.082	0.015		15	0.054	0.014	
15	27	0.097	0.018		139	0.290	0.021		51	0.161	0.021		29	0.104	0.018	
16	19	0.068	0.015		26	0.054	0.010		28	0.089	0.016		53	0.191	0.024	
17	10	0.036	0.011		6	0.013	0.005		22	0.070	0.014		15	0.054	0.014	
18	2	0.007	0.005		32	0.067	0.011		5	0.016	0.007		6	0.022	0.009	
19	2	0.007	0.005		21	0.044	0.009		16	0.051	0.012		4	0.014	0.007	
20	2	0.007	0.005		5	0.010	0.005		6	0.019	0.008		1	0.004	0.004	
21	-	-	-		3	0.006	0.004		3	0.009	0.005		1	0.004	0.004	
22	2	0.007	0.005		3	0.006	0.004		-	-	-		1	0.004	0.004	
23	-	-	-		1	0.002	0.002		2	0.006	0.004		1	0.004	0.004	
24	-	-	-		1	0.002	0.002		-	-	-		-	-	-	
25	-	-	-		2	0.004	0.003		2	0.006	0.004		-	-	-	
26	2	0.007	0.005		3	0.006	0.004		4	0.013	0.006		2	0.007	0.005	
27	-	-	-		1	0.002	0.002		1	0.003	0.003		-	-	-	
28	1	0.004	0.004		4	0.008	0.004		1	0.003	0.003		1	0.004	0.004	
29	3	0.011	0.006		3	0.006	0.004		-	-	-		-	-	-	
30	2	0.007	0.005		2	0.004	0.003		3	0.009	0.005		1	0.004	0.004	
31	-	-	-		1	0.002	0.002		1	0.003	0.003		-	-	-	
32	1	0.004	0.004		2	0.004	0.003		-	-	-		1	0.004	0.004	
33	-	-	-		5	0.010	0.005		2	0.006	0.004		1	0.004	0.004	
34	-	-	-		2	0.004	0.003		2	0.006	0.004		-	-	-	
35	-	-	-		3	0.006	0.004		1	0.003	0.003		-	-	-	
36	-	-	-		-	-	-		1	0.003	0.003		-	-	-	
37	-	-	-		-	-	-		-	-	-		-	-	-	
38	-	-	-		2	0.004	0.003		-	-	-		-	-	-	
39	-	-	-		1	0.002	0.002		-	-	-		-	-	-	
40	-	-	-		1	0.002	0.002		-	-	-		-	-	-	
41	-	-	-		-	-	-		-	-	-		-	-	-	
42	-	-	-		-	-	-		-	-	-		-	-	-	
43	-	-	-		-	-	-		-	-	-		-	-	-	
44	-	-	-		-	-	-		-	-	-		-	-	-	
45	-	-	-		-	-	-		-	-	-		-	-	-	
46	-	-	-		-	-	-		-	-	-		-	-	-	
47	-	-	-		-	-	-		-	-	-		-	-	-	
48	-	-	-		-	-	-		-	-	-		-	-	-	
49	-	-	-		-	-	-		-	-	-		-	-	-	
50	-	-	-		2	0.004	0.003		-	-	-		-	-	-	
Total:	279				479				316				278			

-continued-

Appendix B3.-Page 2 of 4.

Homer:

Age	1992			1993			1994			1995		
	n	p	SE (p)	n	p	SE (p)	n	p	SE (p)	N	p	SE (p)
6	23	0.095	0.019	-	-	-	-	-	-	-	-	-
7	8	0.033	0.012	-	-	-	-	-	-	-	-	-
8	4	0.017	0.008	-	-	-	-	-	-	-	-	-
9	6	0.025	0.010	1	0.006	0.006	2	0.015	0.011	1	0.015	0.015
10	3	0.012	0.007	6	0.034	0.013	13	0.099	0.026	4	0.062	0.030
11	8	0.033	0.012	8	0.045	0.015	6	0.046	0.018	6	0.092	0.036
12	16	0.066	0.016	14	0.078	0.020	11	0.084	0.024	6	0.092	0.036
13	42	0.174	0.024	19	0.106	0.023	9	0.069	0.022	5	0.077	0.033
14	46	0.190	0.025	9	0.050	0.016	13	0.099	0.026	5	0.077	0.033
15	23	0.095	0.019	58	0.324	0.035	41	0.313	0.041	7	0.108	0.039
16	15	0.062	0.016	13	0.073	0.019	11	0.084	0.024	15	0.231	0.053
17	11	0.045	0.013	4	0.022	0.011	3	0.023	0.013	1	0.015	0.015
18	4	0.017	0.008	13	0.073	0.019	3	0.023	0.013	3	0.046	0.026
19	4	0.017	0.008	9	0.050	0.016	1	0.008	0.008	2	0.031	0.022
20	3	0.012	0.007	1	0.006	0.006	2	0.015	0.011	2	0.031	0.022
21	3	0.012	0.007	-	-	-	2	0.015	0.011	1	0.015	0.015
22	1	0.004	0.004	6	0.034	0.013	4	0.031	0.015	2	0.031	0.022
23	-	-	-	-	-	-	-	-	-	1	0.015	0.015
24	1	0.004	0.004	1	0.006	0.006	2	0.015	0.011	-	-	-
25	-	-	-	1	0.006	0.006	-	-	-	-	-	-
26	1	0.004	0.004	-	-	-	-	-	-	1	0.015	0.015
27	1	0.004	0.004	2	0.011	0.008	-	-	-	-	-	-
28	3	0.012	0.007	-	-	-	1	0.008	0.008	-	-	-
29	2	0.008	0.006	2	0.011	0.008	1	0.008	0.008	-	-	-
30	2	0.008	0.006	2	0.011	0.008	1	0.008	0.008	-	-	-
31	1	0.004	0.004	2	0.011	0.008	-	-	-	1	0.015	0.015
32	-	-	-	3	0.017	0.010	2	0.015	0.011	-	-	-
33	1	0.004	0.004	-	-	-	-	-	-	1	0.015	0.015
34	4	0.017	0.008	-	-	-	-	-	-	-	-	-
35	-	-	-	2	0.011	0.008	-	-	-	-	-	-
36	-	-	-	1	0.006	0.006	1	0.008	0.008	1	0.015	0.015
37	4	0.017	0.008	-	-	-	1	0.008	0.008	-	-	-
38	-	-	-	-	-	-	1	0.008	0.008	-	-	-
39	-	-	-	-	-	-	-	-	-	-	-	-
40	-	-	-	-	-	-	-	-	-	-	-	-
41	-	-	-	-	-	-	-	-	-	-	-	-
42	1	0.004	0.004	1	0.006	0.006	-	-	-	-	-	-
43	1	0.004	0.004	-	-	-	-	-	-	-	-	-
44	-	-	-	-	-	-	-	-	-	-	-	-
45	-	-	-	1	0.006	0.006	-	-	-	-	-	-
Total	242			179			131			65		

-continued-

Appendix B3.-Page 3 of 4.

Seward:

Age	1992			1993			1994			1995		
	n	p	SE (p)	n	p	SE (p)	n	p	SE (p)	n	p	SE (p)
4	-	-	-	1	0.002	0.002	-	-	-	1	0.002	0.002
5	-	-	-	3	0.006	0.003	-	-	-	1	0.002	0.002
6	1	0.002	0.002	1	0.002	0.002	2	0.004	0.003	-	-	-
7	9	0.016	0.005	4	0.008	0.004	2	0.004	0.003	5	0.009	0.004
8	18	0.032	0.007	4	0.008	0.004	9	0.016	0.005	1	0.002	0.002
9	51	0.091	0.012	35	0.069	0.011	42	0.076	0.011	26	0.047	0.009
10	107	0.191	0.017	46	0.091	0.013	83	0.150	0.015	57	0.103	0.013
11	85	0.152	0.015	98	0.194	0.018	109	0.197	0.017	75	0.136	0.015
12	70	0.125	0.014	59	0.117	0.014	109	0.197	0.017	121	0.219	0.018
13	29	0.052	0.009	58	0.115	0.014	59	0.106	0.013	85	0.154	0.015
14	52	0.093	0.012	18	0.036	0.008	20	0.036	0.008	35	0.063	0.010
15	36	0.064	0.010	62	0.123	0.015	30	0.054	0.010	29	0.052	0.009
16	28	0.050	0.009	24	0.048	0.009	32	0.058	0.010	44	0.080	0.012
17	25	0.045	0.009	20	0.040	0.009	13	0.023	0.006	11	0.020	0.006
18	17	0.030	0.007	19	0.038	0.008	11	0.020	0.006	9	0.016	0.005
19	4	0.007	0.004	20	0.040	0.009	11	0.020	0.006	10	0.018	0.006
20	3	0.005	0.003	10	0.020	0.006	4	0.007	0.004	12	0.022	0.006
21	7	0.013	0.005	2	0.004	0.003	3	0.005	0.003	6	0.011	0.004
22	3	0.005	0.003	2	0.004	0.003	2	0.004	0.003	4	0.007	0.004
23	1	0.002	0.002	4	0.008	0.004	1	0.002	0.002	1	0.002	0.002
24	-	-	-	-	-	-	-	-	-	-	-	-
25	-	-	-	1	0.002	0.002	1	0.002	0.002	3	0.005	0.003
26	2	0.004	0.003	1	0.002	0.002	-	-	-	1	0.002	0.002
27	3	0.005	0.003	1	0.002	0.002	2	0.004	0.003	3	0.005	0.003
28	2	0.004	0.003	2	0.004	0.003	1	0.002	0.002	2	0.004	0.003
29	2	0.004	0.003	4	0.008	0.004	3	0.005	0.003	5	0.009	0.004
30	1	0.002	0.002	1	0.002	0.002	2	0.004	0.003	3	0.005	0.003
31	-	-	-	1	0.002	0.002	1	0.002	0.002	1	0.002	0.002
32	-	-	-	1	0.002	0.002	-	-	-	1	0.002	0.002
33	-	-	-	-	-	-	1	0.002	0.002	1	0.002	0.002
34	2	0.004	0.003	-	-	-	-	-	-	-	-	-
35	1	0.002	0.002	-	-	-	1	0.002	0.002	-	-	-
36	1	0.002	0.002	-	-	-	-	-	-	-	-	-
37	-	-	-	2	0.004	0.003	-	-	-	-	-	-
Total	560			504			554			553		

-continued-

Appendix B3.-Page 4 of 4.

Valdez:

Age	1992			1993			1994			1995		
	n	p	SE (p)	n	p	SE (p)	n	p	SE (p)	n	p	SE (p)
8	-	-	-	1	0.007	0.007	-	-	-	-	-	-
9	4	0.021	0.010	-	-	-	-	-	-	-	-	-
10	9	0.047	0.015	1	0.007	0.007	5	0.049	0.021	-	-	-
11	6	0.031	0.013	4	0.027	0.013	6	0.059	0.023	1	0.016	0.016
12	22	0.115	0.023	3	0.020	0.012	19	0.186	0.039	5	0.078	0.034
13	33	0.172	0.027	7	0.047	0.017	4	0.039	0.019	9	0.141	0.044
14	49	0.255	0.032	9	0.060	0.020	14	0.137	0.034	11	0.172	0.048
15	26	0.135	0.025	20	0.134	0.028	20	0.196	0.040	12	0.188	0.049
16	10	0.052	0.016	24	0.161	0.030	11	0.108	0.031	11	0.172	0.048
17	11	0.057	0.017	24	0.161	0.030	6	0.059	0.023	6	0.094	0.037
18	11	0.057	0.017	16	0.107	0.025	5	0.049	0.021	4	0.063	0.030
19	2	0.010	0.007	16	0.107	0.025	6	0.059	0.023	2	0.031	0.022
20	3	0.016	0.009	11	0.074	0.021	-	-	-	2	0.031	0.022
21	-	-	-	2	0.013	0.009	1	0.010	0.010	-	-	-
22	1	0.005	0.005	3	0.020	0.012	-	-	-	1	0.016	0.016
23	-	-	-	3	0.020	0.012	2	0.020	0.014	-	-	-
24	1	0.005	0.005	2	0.013	0.009	-	-	-	-	-	-
25	-	-	-	-	-	-	-	-	-	-	-	-
26	-	-	-	1	0.007	0.007	-	-	-	-	-	-
27	-	-	-	1	0.007	0.007	1	0.010	0.010	-	-	-
28	-	-	-	-	-	-	1	0.010	0.010	-	-	-
29	1	0.005	0.005	-	-	-	-	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-	-	-
31	-	-	-	-	-	-	1	0.010	0.010	-	-	-
32	1	0.005	0.005	-	-	-	-	-	-	-	-	-
33	-	-	-	-	-	-	-	-	-	-	-	-
34	2	0.010	0.007	-	-	-	-	-	-	-	-	-
35	-	-	-	1	0.007	0.007	-	-	-	-	-	-
Total	192			149			102			64		

Note: A dash (-) indicates a value of 0.

Appendix B4.-Estimated age composition of the yelloweye rockfish sport harvest landed at Homer, Seward, and Valdez, 1992-1995.

Homer:

Age	1992			1993			1994		
	n	p	SE (p)	n	p	SE (p)	n	p	SE (p)
10	1	0.008	0.008	-	-	-	-	-	-
11	1	0.008	0.008	1	0.004	0.004	-	-	-
12	-	-	-	-	-	-	-	-	-
13	-	-	-	-	-	-	1	0.006	0.006
14	1	0.008	0.008	-	-	-	-	-	-
15	2	0.015	0.011	1	0.004	0.004	-	-	-
16	5	0.038	0.017	-	-	-	-	-	-
17	3	0.023	0.013	-	-	-	1	0.006	0.006
18	1	0.008	0.008	3	0.013	0.007	-	-	-
19	4	0.031	0.015	3	0.013	0.007	4	0.026	0.013
20	3	0.023	0.013	1	0.004	0.004	3	0.019	0.011
21	6	0.046	0.018	-	-	-	3	0.019	0.011
22	9	0.069	0.022	1	0.004	0.004	3	0.019	0.011
23	18	0.138	0.030	-	-	-	2	0.013	0.009
24	24	0.185	0.034	7	0.030	0.011	2	0.013	0.009
25	11	0.085	0.025	25	0.107	0.020	3	0.019	0.011
26	3	0.023	0.013	21	0.090	0.019	3	0.019	0.011
27	2	0.015	0.011	19	0.081	0.018	16	0.104	0.025
28	-	-	-	17	0.073	0.017	15	0.097	0.024
29	1	0.008	0.008	4	0.017	0.008	14	0.091	0.023
30	1	0.008	0.008	5	0.021	0.009	9	0.058	0.019
31	1	0.008	0.008	5	0.021	0.009	6	0.039	0.016
32	1	0.008	0.008	4	0.017	0.008	6	0.039	0.016
33	4	0.031	0.015	8	0.034	0.012	-	-	-
34	4	0.031	0.015	2	0.009	0.006	4	0.026	0.013
35	5	0.038	0.017	6	0.026	0.010	5	0.032	0.014
36	1	0.008	0.008	9	0.038	0.013	3	0.019	0.011
37	3	0.023	0.013	11	0.047	0.014	3	0.019	0.011
38	-	-	-	20	0.085	0.018	5	0.032	0.014
39	1	0.008	0.008	2	0.009	0.006	6	0.039	0.016
40	1	0.008	0.008	4	0.017	0.008	4	0.026	0.013
41	1	0.008	0.008	5	0.021	0.009	5	0.032	0.014
42	1	0.008	0.008	2	0.009	0.006	5	0.032	0.014
43	1	0.008	0.008	8	0.034	0.012	4	0.026	0.013
44	1	0.008	0.008	3	0.013	0.007	1	0.006	0.006
45	-	-	-	4	0.017	0.008	-	-	-
46	-	-	-	3	0.013	0.007	3	0.019	0.011
47	1	0.008	0.008	1	0.004	0.004	-	-	-
48	1	0.008	0.008	-	-	-	1	0.006	0.006
49	-	-	-	-	-	-	5	0.032	0.014
50	1	0.008	0.008	4	0.017	0.008	-	-	-
51	-	-	-	4	0.017	0.008	2	0.013	0.009
52	1	0.008	0.008	-	-	-	1	0.006	0.006
53	-	-	-	2	0.009	0.006	1	0.006	0.006
54	-	-	-	1	0.004	0.004	1	0.006	0.006
55	-	-	-	1	0.004	0.004	-	-	-
56	-	-	-	-	-	-	-	-	-
57	-	-	-	1	0.004	0.004	1	0.006	0.006
58	-	-	-	-	-	-	-	-	-
59	-	-	-	1	0.004	0.004	-	-	-

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Appendix B4.-Page 2 of 5.

Homer (continued):

Age	1992			1993			1994		
	n	p	SE (p)	n	p	SE (p)	n	p	SE (p)
60	2	0.015	0.011	1	0.004	0.004	-	-	-
61	1	0.008	0.008	1	0.004	0.004	-	-	-
62	1	0.008	0.008	-	-	-	-	-	-
63	-	-	-	2	0.009	0.006	-	-	-
64	-	-	-	1	0.004	0.004	-	-	-
65	-	-	-	1	0.004	0.004	-	-	-
66	-	-	-	2	0.009	0.006	-	-	-
67	-	-	-	-	-	-	-	-	-
68	-	-	-	1	0.004	0.004	-	-	-
69	-	-	-	3	0.013	0.007	-	-	-
70	-	-	-	1	0.004	0.004	-	-	-
71	-	-	-	-	-	-	-	-	-
72	-	-	-	-	-	-	2	0.013	0.009
73	1	0.008	0.008	-	-	-	-	-	-
74	-	-	-	-	-	-	-	-	-
75	-	-	-	-	-	-	-	-	-
76	-	-	-	-	-	-	1	0.006	0.006
77	-	-	-	1	0.004	0.004	-	-	-
78	-	-	-	-	-	-	-	-	-
79	-	-	-	1	0.004	0.004	-	-	-
Total	130			234			154		

Seward:

Age	1992			1993			1994			1995		
	n	p	SE (p)	n	p	SE (p)	n	p	SE (p)	n	p	SE (p)
10	-	-	-	1	0.004	0.004	-	-	-	3	0.010	0.006
11	-	-	-	-	-	-	-	-	-	1	0.003	0.003
12	3	0.017	0.010	1	0.004	0.004	-	-	-	3	0.010	0.006
13	1	0.006	0.006	2	0.009	0.006	-	-	-	3	0.010	0.006
14	-	-	-	3	0.013	0.008	2	0.014	0.010	8	0.027	0.009
15	1	0.006	0.006	1	0.004	0.004	-	-	-	4	0.013	0.007
16	-	-	-	-	-	-	2	0.014	0.010	3	0.010	0.006
17	5	0.028	0.012	2	0.009	0.006	1	0.007	0.007	6	0.020	0.008
18	3	0.017	0.010	7	0.031	0.012	-	-	-	8	0.027	0.009
19	3	0.017	0.010	2	0.009	0.006	5	0.034	0.015	4	0.013	0.007
20	4	0.022	0.011	6	0.027	0.011	3	0.021	0.012	5	0.017	0.007
21	6	0.033	0.013	6	0.027	0.011	3	0.021	0.012	7	0.024	0.009
22	3	0.017	0.010	-	-	-	3	0.021	0.012	8	0.027	0.009
23	10	0.055	0.017	6	0.027	0.011	1	0.007	0.007	5	0.017	0.007
24	20	0.110	0.023	23	0.102	0.020	1	0.007	0.007	12	0.040	0.011
25	21	0.116	0.024	28	0.124	0.022	5	0.034	0.015	24	0.081	0.016
26	11	0.061	0.018	32	0.142	0.023	7	0.048	0.018	35	0.118	0.019
27	6	0.033	0.013	19	0.084	0.018	27	0.186	0.032	36	0.121	0.019
28	4	0.022	0.011	9	0.040	0.013	16	0.110	0.026	11	0.037	0.011
29	4	0.022	0.011	4	0.018	0.009	8	0.055	0.019	12	0.040	0.011
30	3	0.017	0.010	3	0.013	0.008	6	0.041	0.017	6	0.020	0.008
31	3	0.017	0.010	3	0.013	0.008	2	0.014	0.010	7	0.024	0.009
32	5	0.028	0.012	4	0.018	0.009	-	-	-	4	0.013	0.007
33	6	0.033	0.013	5	0.022	0.010	3	0.021	0.012	5	0.017	0.007
34	6	0.033	0.013	7	0.031	0.012	3	0.021	0.012	6	0.020	0.008
35	5	0.028	0.012	10	0.044	0.014	7	0.048	0.018	5	0.017	0.007

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Appendix B4.-Page 3 of 5.

Seward (continued):

Age	1992			1993			1994			1995		
	n	p	SE (p)	n	p	SE (p)	n	p	SE (p)	n	p	SE (p)
36	5	0.028	0.012	8	0.035	0.012	5	0.034	0.015	11	0.037	0.011
37	3	0.017	0.010	3	0.013	0.008	5	0.034	0.015	11	0.037	0.011
38	2	0.011	0.008	3	0.013	0.008	3	0.021	0.012	6	0.020	0.008
39	1	0.006	0.006	-	-	-	2	0.014	0.010	3	0.010	0.006
40	1	0.006	0.006	3	0.013	0.008	2	0.014	0.010	-	-	-
41	5	0.028	0.012	1	0.004	0.004	1	0.007	0.007	-	-	-
42	-	-	-	3	0.013	0.008	2	0.014	0.010	5	0.017	0.007
43	3	0.017	0.010	1	0.004	0.004	4	0.028	0.014	4	0.013	0.007
44	1	0.006	0.006	2	0.009	0.006	-	-	-	2	0.007	0.005
45	2	0.011	0.008	2	0.009	0.006	3	0.021	0.012	2	0.007	0.005
46	3	0.017	0.010	1	0.004	0.004	1	0.007	0.007	5	0.017	0.007
47	1	0.006	0.006	-	-	-	1	0.007	0.007	1	0.003	0.003
48	1	0.006	0.006	-	-	-	1	0.007	0.007	-	-	-
49	-	-	-	-	-	-	-	-	-	-	-	-
50	-	-	-	1	0.004	0.004	-	-	-	-	-	-
51	1	0.006	0.006	-	-	-	-	-	-	2	0.007	0.005
52	3	0.017	0.010	2	0.009	0.006	1	0.007	0.007	-	-	-
53	1	0.006	0.006	1	0.004	0.004	1	0.007	0.007	-	-	-
54	2	0.011	0.008	1	0.004	0.004	-	-	-	2	0.007	0.005
55	1	0.006	0.006	-	-	-	-	-	-	1	0.003	0.003
56	-	-	-	-	-	-	-	-	-	3	0.010	0.006
57	2	0.011	0.008	-	-	-	-	-	-	-	-	-
58	-	-	-	1	0.004	0.004	-	-	-	-	-	-
59	1	0.006	0.006	-	-	-	-	-	-	-	-	-
60	2	0.011	0.008	-	-	-	-	-	-	1	0.003	0.003
61	1	0.006	0.006	-	-	-	-	-	-	1	0.003	0.003
62	-	-	-	-	-	-	1	0.007	0.007	-	-	-
63	-	-	-	-	-	-	1	0.007	0.007	2	0.007	0.005
64	-	-	-	-	-	-	-	-	-	1	0.003	0.003
65	1	0.006	0.006	-	-	-	-	-	-	1	0.003	0.003
66	4	0.022	0.011	1	0.004	0.004	1	0.007	0.007	-	-	-
67	-	-	-	1	0.004	0.004	-	-	-	-	-	-
68	-	-	-	1	0.004	0.004	1	0.007	0.007	-	-	-
69	-	-	-	1	0.004	0.004	-	-	-	1	0.003	0.003
70	1	0.006	0.006	2	0.009	0.006	-	-	-	-	-	-
71	-	-	-	-	-	-	1	0.007	0.007	-	-	-
72	-	-	-	1	0.004	0.004	-	-	-	-	-	-
73	-	-	-	-	-	-	-	-	-	-	-	-
74	-	-	-	-	-	-	-	-	-	-	-	-
75	-	-	-	1	0.004	0.004	-	-	-	-	-	-
76	-	-	-	-	-	-	-	-	-	-	-	-
77	-	-	-	1	0.004	0.004	-	-	-	-	-	-
78	-	-	-	-	-	-	1	0.007	0.007	1	0.003	0.003
79	-	-	-	-	-	-	-	-	-	-	-	-
80	-	-	-	-	-	-	-	-	-	-	-	-
81	-	-	-	-	-	-	-	-	-	-	-	-
82	-	-	-	-	-	-	-	-	-	-	-	-
83	-	-	-	-	-	-	-	-	-	-	-	-
84	-	-	-	-	-	-	-	-	-	-	-	-
85	-	-	-	-	-	-	-	-	-	-	-	-

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Appendix B4.-Page 4 of 5.
Seward (continued):

Age	1992			1993			1994			1995		
	n	p	SE (p)	n	p	SE (p)	n	p	SE (p)	n	p	SE (p)
86	-	-	-	-	-	-	-	-	-	-	-	-
87	-	-	-	-	-	-	-	-	-	-	-	-
88	-	-	-	-	-	-	-	-	-	-	-	-
89	-	-	-	-	-	-	-	-	-	-	-	-
90	-	-	-	-	-	-	-	-	-	-	-	-
91	-	-	-	-	-	-	-	-	-	-	-	-
92	-	-	-	-	-	-	-	-	-	-	-	-
93	-	-	-	-	-	-	-	-	-	-	-	-
94	-	-	-	-	-	-	-	-	-	-	-	-
95	-	-	-	-	-	-	-	-	-	-	-	-
96	-	-	-	-	-	-	-	-	-	-	-	-
97	-	-	-	-	-	-	-	-	-	-	-	-
98	-	-	-	-	-	-	-	-	-	-	-	-
99	-	-	-	-	-	-	-	-	-	-	-	-
100	-	-	-	-	-	-	1	0.007	0.007	-	-	-
101	-	-	-	-	-	-	-	-	-	-	-	-
102	-	-	-	-	-	-	-	-	-	-	-	-
103	-	-	-	-	-	-	1	0.007	0.007	-	-	-
Total	181			226			145			297		

Valdez:

Age	1992			1993			1994			1995		
	n	p	SE (p)	n	p	SE (p)	n	p	SE (p)	n	p	SE (p)
5	1	0.005	0.005	-	-	-	-	-	-	-	-	-
6	-	-	-	-	-	-	-	-	-	-	-	-
7	-	-	-	-	-	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-	-	-	-	-	-
9	-	-	-	-	-	-	-	-	-	-	-	-
10	1	0.005	0.005	-	-	-	-	-	-	-	-	-
11	1	0.005	0.005	1	0.002	0.002	-	-	-	1	0.013	0.013
12	5	0.027	0.012	4	0.009	0.004	-	-	-	-	-	-
13	2	0.011	0.008	2	0.004	0.003	2	0.016	0.011	2	0.026	0.018
14	13	0.070	0.019	10	0.021	0.007	2	0.016	0.011	-	-	-
15	7	0.037	0.014	6	0.013	0.005	4	0.033	0.016	1	0.013	0.013
16	9	0.048	0.016	19	0.041	0.009	5	0.041	0.018	2	0.026	0.018
17	7	0.037	0.014	22	0.047	0.010	4	0.033	0.016	1	0.013	0.013
18	5	0.027	0.012	17	0.036	0.009	5	0.041	0.018	1	0.013	0.013
19	3	0.016	0.009	11	0.023	0.007	8	0.065	0.022	5	0.066	0.029
20	7	0.037	0.014	6	0.013	0.005	8	0.065	0.022	4	0.053	0.026
21	5	0.027	0.012	6	0.013	0.005	6	0.049	0.020	2	0.026	0.018
22	2	0.011	0.008	4	0.009	0.004	4	0.033	0.016	-	-	-
23	12	0.064	0.018	2	0.004	0.003	3	0.024	0.014	1	0.013	0.013
24	9	0.048	0.016	19	0.041	0.009	3	0.024	0.014	2	0.026	0.018
25	9	0.048	0.016	67	0.143	0.016	2	0.016	0.011	2	0.026	0.018
26	11	0.059	0.017	57	0.122	0.015	3	0.024	0.014	8	0.105	0.035
27	6	0.032	0.013	27	0.058	0.011	9	0.073	0.024	8	0.105	0.035
28	2	0.011	0.008	14	0.030	0.008	13	0.106	0.028	-	-	-
29	8	0.043	0.015	7	0.015	0.006	4	0.033	0.016	1	0.013	0.013
30	5	0.027	0.012	7	0.015	0.006	2	0.016	0.011	-	-	-
31	3	0.016	0.009	7	0.015	0.006	3	0.024	0.014	-	-	-
32	5	0.027	0.012	10	0.021	0.007	2	0.016	0.011	2	0.026	0.018
33	1	0.005	0.005	21	0.045	0.010	1	0.008	0.008	5	0.066	0.029

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Appendix B4.-Page 5 of 5.
Valdez (continued):

Age	1992			1993			1994			1995		
	n	p	SE (p)	n	p	SE (p)	n	p	SE (p)	n	p	SE (p)
34	4	0.021	0.011	6	0.013	0.005	2	0.016	0.011	-	-	-
35	3	0.016	0.009	7	0.015	0.006	1	0.008	0.008	2	0.026	0.018
36	2	0.011	0.008	24	0.051	0.010	1	0.008	0.008	-	-	-
37	3	0.016	0.009	6	0.013	0.005	2	0.016	0.011	4	0.053	0.026
38	1	0.005	0.005	6	0.013	0.005	4	0.033	0.016	1	0.013	0.013
39	1	0.005	0.005	10	0.021	0.007	-	-	-	2	0.026	0.018
40	2	0.011	0.008	1	0.002	0.002	2	0.016	0.011	1	0.013	0.013
41	4	0.021	0.011	4	0.009	0.004	4	0.033	0.016	1	0.013	0.013
42	2	0.011	0.008	9	0.019	0.006	2	0.016	0.011	2	0.026	0.018
43	5	0.027	0.012	5	0.011	0.005	2	0.016	0.011	2	0.026	0.018
44	-	-	-	6	0.013	0.005	1	0.008	0.008	-	-	-
45	-	-	-	2	0.004	0.003	-	-	-	1	0.013	0.013
46	1	0.005	0.005	1	0.002	0.002	-	-	-	-	-	-
47	1	0.005	0.005	2	0.004	0.003	-	-	-	-	-	-
48	1	0.005	0.005	-	-	-	-	-	-	3	0.039	0.022
49	2	0.011	0.008	2	0.004	0.003	-	-	-	-	-	-
50	-	-	-	2	0.004	0.003	-	-	-	-	-	-
51	2	0.011	0.008	2	0.004	0.003	-	-	-	-	-	-
52	1	0.005	0.005	4	0.009	0.004	1	0.008	0.008	1	0.013	0.013
53	-	-	-	3	0.006	0.004	-	-	-	-	-	-
54	1	0.005	0.005	2	0.004	0.003	4	0.033	0.016	2	0.026	0.018
55	-	-	-	5	0.011	0.005	1	0.008	0.008	-	-	-
56	1	0.005	0.005	-	-	-	1	0.008	0.008	-	-	-
57	2	0.011	0.008	1	0.002	0.002	1	0.008	0.008	-	-	-
58	2	0.011	0.008	-	-	-	-	-	-	-	-	-
59	1	0.005	0.005	-	-	-	-	-	-	1	0.013	0.013
60	2	0.011	0.008	1	0.002	0.002	-	-	-	-	-	-
61	-	-	-	-	-	-	1	0.008	0.008	-	-	-
62	1	0.005	0.005	1	0.002	0.002	-	-	-	-	-	-
63	-	-	-	1	0.002	0.002	-	-	-	1	0.013	0.013
64	-	-	-	1	0.002	0.002	-	-	-	3	0.039	0.022
65	-	-	-	1	0.002	0.002	-	-	-	-	-	-
66	-	-	-	1	0.002	0.002	-	-	-	1	0.013	0.013
67	-	-	-	3	0.006	0.004	-	-	-	-	-	-
68	1	0.005	0.005	-	-	-	-	-	-	-	-	-
69	-	-	-	1	0.002	0.002	-	-	-	-	-	-
70	-	-	-	-	-	-	-	-	-	-	-	-
71	-	-	-	1	0.002	0.002	-	-	-	-	-	-
72	-	-	-	-	-	-	-	-	-	-	-	-
73	-	-	-	-	-	-	-	-	-	-	-	-
74	1	0.005	0.005	-	-	-	-	-	-	-	-	-
75	-	-	-	-	-	-	-	-	-	-	-	-
76	-	-	-	1	0.002	0.002	-	-	-	-	-	-
77	-	-	-	-	-	-	-	-	-	-	-	-
78	-	-	-	-	-	-	-	-	-	-	-	-
79	-	-	-	-	-	-	-	-	-	-	-	-
80	-	-	-	-	-	-	-	-	-	-	-	-
81	-	-	-	-	-	-	-	-	-	-	-	-
82	1	0.005	0.005	-	-	-	-	-	-	-	-	-
83	-	-	-	1	0.002	0.002	-	-	-	-	-	-
Total	187			469			123			76		

Note: A dash (-) indicates a value of 0.

Appendix B5.-Estimated age composition of the dusky rockfish sport harvest landed at Kodiak, Homer, and Seward, 1992-1995.

Kodiak:

Age	1992			1993			1994			1995		
	n	p	SE (p)	n	p	SE (p)	n	p	SE (p)	n	p	SE (p)
5	-	-	-	-	-	-	-	-	-	2	0.024	0.017
6	-	-	-	-	-	-	-	-	-	4	0.048	0.024
7	13	0.116	0.030	1	0.006	0.006	2	0.018	0.012	-	-	-
8	14	0.125	0.031	2	0.012	0.008	3	0.026	0.015	1	0.012	0.012
9	7	0.063	0.023	2	0.012	0.008	1	0.009	0.009	10	0.120	0.036
10	3	0.027	0.015	5	0.030	0.013	7	0.061	0.023	7	0.084	0.031
11	6	0.054	0.021	13	0.077	0.021	7	0.061	0.023	7	0.084	0.031
12	4	0.036	0.018	5	0.030	0.013	7	0.061	0.023	6	0.072	0.029
13	2	0.018	0.013	8	0.047	0.016	3	0.026	0.015	4	0.048	0.024
14	5	0.045	0.020	6	0.036	0.014	10	0.088	0.027	2	0.024	0.017
15	2	0.018	0.013	10	0.059	0.018	8	0.070	0.024	4	0.048	0.024
16	1	0.009	0.009	4	0.024	0.012	7	0.061	0.023	3	0.036	0.021
17	4	0.036	0.018	7	0.041	0.015	2	0.018	0.012	4	0.048	0.024
18	8	0.071	0.024	7	0.041	0.015	10	0.088	0.027	4	0.048	0.024
19	-	-	-	6	0.036	0.014	5	0.044	0.019	5	0.060	0.026
20	4	0.036	0.018	6	0.036	0.014	5	0.044	0.019	-	-	-
21	8	0.071	0.024	8	0.047	0.016	2	0.018	0.012	4	0.048	0.024
22	1	0.009	0.009	2	0.012	0.008	2	0.018	0.012	2	0.024	0.017
23	2	0.018	0.013	9	0.053	0.017	4	0.035	0.017	1	0.012	0.012
24	3	0.027	0.015	6	0.036	0.014	6	0.053	0.021	1	0.012	0.012
25	1	0.009	0.009	3	0.018	0.010	1	0.009	0.009	2	0.024	0.017
26	4	0.036	0.018	6	0.036	0.014	2	0.018	0.012	1	0.012	0.012
27	4	0.036	0.018	6	0.036	0.014	6	0.053	0.021	1	0.012	0.012
28	-	-	-	2	0.012	0.008	1	0.009	0.009	-	-	-
29	-	-	-	5	0.030	0.013	3	0.026	0.015	1	0.012	0.012
30	1	0.009	0.009	1	0.006	0.006	3	0.026	0.015	-	-	-
31	1	0.009	0.009	9	0.053	0.017	-	-	-	-	-	-
32	1	0.009	0.009	4	0.024	0.012	-	-	-	2	0.024	0.017
33	-	-	-	4	0.024	0.012	1	0.009	0.009	3	0.036	0.021
34	1	0.009	0.009	2	0.012	0.008	4	0.035	0.017	-	-	-
35	3	0.027	0.015	2	0.012	0.008	1	0.009	0.009	-	-	-
36	2	0.018	0.013	2	0.012	0.008	-	-	-	1	0.012	0.012
37	1	0.009	0.009	2	0.012	0.008	-	-	-	1	0.012	0.012
38	1	0.009	0.009	1	0.006	0.006	-	-	-	-	-	-
39	1	0.009	0.009	3	0.018	0.010	-	-	-	-	-	-
40	-	-	-	1	0.006	0.006	-	-	-	-	-	-
41	1	0.009	0.009	2	0.012	0.008	-	-	-	-	-	-
42	-	-	-	2	0.012	0.008	-	-	-	-	-	-
43	-	-	-	1	0.006	0.006	1	0.009	0.009	-	-	-
44	-	-	-	1	0.006	0.006	-	-	-	-	-	-
45	1	0.009	0.009	1	0.006	0.006	-	-	-	-	-	-
46	-	-	-	-	-	-	-	-	-	-	-	-
47	-	-	-	-	-	-	-	-	-	-	-	-
48	-	-	-	1	0.006	0.006	-	-	-	-	-	-
49	-	-	-	-	-	-	-	-	-	-	-	-
50	-	-	-	-	-	-	-	-	-	-	-	-
51	-	-	-	-	-	-	-	-	-	-	-	-
52	-	-	-	-	-	-	-	-	-	-	-	-
53	-	-	-	-	-	-	-	-	-	-	-	-

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Appendix B5.-Page 2 of 4.

Kodiak (continued):

Age	1992			1993			1994			1995		
	n	p	SE (p)	n	p	SE (p)	n	p	SE (p)	n	p	SE (p)
54	-	-	-	-	-	-	-	-	-	-	-	-
55	-	-	-	1	0.006	0.006	-	-	-	-	-	-
56	-	-	-	-	-	-	-	-	-	-	-	-
57	-	-	-	-	-	-	-	-	-	-	-	-
58	-	-	-	-	-	-	-	-	-	-	-	-
59	-	-	-	-	-	-	-	-	-	-	-	-
60	-	-	-	-	-	-	-	-	-	-	-	-
61	1	0.009	0.009	-	-	-	-	-	-	-	-	-
62	-	-	-	-	-	-	-	-	-	-	-	-
63	-	-	-	-	-	-	-	-	-	-	-	-
64	-	-	-	-	-	-	-	-	-	-	-	-
65	-	-	-	-	-	-	-	-	-	-	-	-
66	-	-	-	-	-	-	-	-	-	-	-	-
67	1	0.009	0.009	-	-	-	-	-	-	-	-	-
112				169			114			83		

Homer:

Age	1992			1993			1994		
	n	p	SE (p)	n	p	SE (p)	n	p	SE (p)
6	21	0.135	0.027	-	-	-	1	0.011	0.011
7	21	0.135	0.027	-	-	-	-	-	-
8	28	0.179	0.031	4	0.039	0.019	14	0.154	0.038
9	33	0.212	0.033	10	0.097	0.029	22	0.242	0.045
10	7	0.045	0.017	11	0.107	0.031	9	0.099	0.031
11	5	0.032	0.014	4	0.039	0.019	4	0.044	0.022
12	2	0.013	0.009	4	0.039	0.019	4	0.044	0.022
13	2	0.013	0.009	2	0.019	0.014	5	0.055	0.024
14	4	0.026	0.013	2	0.019	0.014	5	0.055	0.024
15	3	0.019	0.011	5	0.049	0.021	3	0.033	0.019
16	3	0.019	0.011	2	0.019	0.014	3	0.033	0.019
17	4	0.026	0.013	3	0.029	0.017	2	0.022	0.015
18	-	-	-	1	0.010	0.010	1	0.011	0.011
19	-	-	-	7	0.068	0.025	3	0.033	0.019
20	-	-	-	2	0.019	0.014	2	0.022	0.015
21	1	0.006	0.006	4	0.039	0.019	-	-	-
22	1	0.006	0.006	3	0.029	0.017	1	0.011	0.011
23	4	0.026	0.013	3	0.029	0.017	2	0.022	0.015
24	-	-	-	2	0.019	0.014	1	0.011	0.011
25	2	0.013	0.009	8	0.078	0.027	1	0.011	0.011
26	-	-	-	4	0.039	0.019	2	0.022	0.015
27	2	0.013	0.009	1	0.010	0.010	-	-	-
28	2	0.013	0.009	1	0.010	0.010	-	-	-
29	-	-	-	-	-	-	1	0.011	0.011
30	1	0.006	0.006	2	0.019	0.014	-	-	-
31	1	0.006	0.006	-	-	-	2	0.022	0.015
32	-	-	-	5	0.049	0.021	1	0.011	0.011
33	1	0.006	0.006	-	-	-	-	-	-
34	2	0.013	0.009	1	0.010	0.010	1	0.011	0.011
35	2	0.013	0.009	-	-	-	-	-	-

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Appendix B5.-Page 3 of 4.

Homer (continued):

Age	1992			1993			1994		
	n	p	SE (p)	n	p	SE (p)	n	p	SE (p)
36	-	-	-	-	-	-	-	-	-
37	-	-	-	2	0.019	0.014	-	-	-
38	2	0.013	0.009	1	0.010	0.010	-	-	-
39	-	-	-	-	-	-	-	-	-
40	1	0.006	0.006	2	0.019	0.014	1	0.011	0.011
41	-	-	-	-	-	-	-	-	-
42	-	-	-	1	0.010	0.010	-	-	-
43	-	-	-	-	-	-	-	-	-
44	-	-	-	4	0.039	0.019	-	-	-
45	1	0.006	0.006	1	0.010	0.010	-	-	-
46	-	-	-	-	-	-	-	-	-
47	-	-	-	-	-	-	-	-	-
48	-	-	-	1	0.010	0.010	-	-	-
	156			103			91		

Seward:

Age	1993		
	n	p	SE (p)
5	2	0.015	0.010
6	-	-	-
7	-	-	-
8	3	0.022	0.013
9	4	0.030	0.015
10	1	0.007	0.007
11	3	0.022	0.013
12	3	0.022	0.013
13	4	0.030	0.015
14	3	0.022	0.013
15	5	0.037	0.016
16	6	0.044	0.018
17	9	0.067	0.022
18	12	0.089	0.025
19	12	0.089	0.025
20	4	0.030	0.015
21	4	0.030	0.015
22	3	0.022	0.013
23	6	0.044	0.018
24	8	0.059	0.020
25	8	0.059	0.020
26	5	0.037	0.016
27	5	0.037	0.016
28	4	0.030	0.015
29	7	0.052	0.019
30	1	0.007	0.007
31	2	0.015	0.010
32	2	0.015	0.010
33	-	-	-
34	1	0.007	0.007
35	3	0.022	0.013

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Appendix B5.-Page 4 of 4.

Seward (continued):

Age	1993		
	n	p	SE (p)
36	1	0.007	0.007
37	1	0.007	0.007
38	1	0.007	0.007
39	1	0.007	0.007
40	-	-	-
41	-	-	-
42	-	-	-
43	-	-	-
44	1	0.007	0.007
135			

Note: A dash (-) indicates a value of 0.

Appendix B6.-Estimated sex composition of the black rockfish sport harvest landed at Kodiak, Homer, Seward, and Valdez, 1992-1995.

Port	Year	Sample Size	p Female	p Male	SE (p)
Kodiak	1992	243	0.317	0.683	0.030
	1993	788	0.373	0.627	0.017
	1994	349	0.401	0.599	0.026
	1995	291	0.392	0.608	0.029
Homer	1992	240	0.467	0.533	0.032
	1993	180	0.522	0.478	0.037
	1994	140	0.457	0.543	0.042
	1995	65	0.508	0.492	0.062
Seward	1992	1,700	0.585	0.415	0.012
	1993	647	0.558	0.442	0.020
	1994	682	0.582	0.418	0.019
	1995	579	0.587	0.413	0.020
Valdez	1992	320	0.781	0.219	0.023
	1993	131	0.664	0.336	0.041
	1994	101	0.703	0.297	0.046
	1995	64	0.844	0.156	0.046

Appendix B7.-Estimated sex composition of the yelloweye rockfish sport harvest landed at Homer, Seward, and Valdez, 1992-1995.

Port	Year	Sample Size	p Female	p Male	SE (p)
Homer	1992	238	0.416	0.584	0.032
	1993	221	0.439	0.561	0.033
	1994	144	0.507	0.493	0.042
	1995	52	0.423	0.577	0.069
Seward	1992	345	0.475	0.525	0.027
	1993	214	0.453	0.547	0.034
	1994	143	0.531	0.469	0.042
	1995	312	0.487	0.513	0.028
Valdez	1992	283	0.572	0.428	0.029
	1993	424	0.488	0.512	0.024
	1994	97	0.464	0.536	0.051
	1995	73	0.575	0.425	0.058

Appendix B8.-Estimated sex composition of the dusky rockfish sport harvest landed at Kodiak, Homer, and Seward, 1992-1995. Sample sizes for missing years were too low to produce reliable estimates.

Port	Year	Sample Size	p Female	p Male	SE (p)
Kodiak	1992	86	0.535	0.465	0.054
	1993	139	0.734	0.266	0.038
	1994	121	0.661	0.339	0.043
	1995	90	0.633	0.367	0.051
Homer	1992	287	0.516	0.484	0.030
	1993	95	0.653	0.347	0.049
	1994	75	0.533	0.467	0.058
Seward	1993	123	0.634	0.366	0.044

Appendix B9.-Estimated sex composition of the quillback rockfish sport harvest landed at Seward and Valdez, 1992-1995. Sample sizes for missing years were too low to produce reliable estimates.

Port	Year	Sample Size	p Female	p Male	SE (p)
Seward	1992	76	0.474	0.526	0.058
	1993	62	0.403	0.597	0.063
	1995	92	0.435	0.565	0.052
Valdez	1992	101	0.535	0.465	0.050
	1993	67	0.478	0.522	0.061

Appendix B10.-Effort for bottomfish and harvest of rockfish by user group and ADF&G statistical area for anglers interviewed at Kodiak, 1992-1995.

Distribution of Bottomfish Effort:

Stat Area	Number of Angler-Days				Proportion of Angler -Days (p)				SE (p)			
	1992	1993	1994	1995	1992	1993	1994	1995	1992	1993	1994	1995
Charter:												
525731	45	32	47	19	0.360	0.155	0.100	0.054	0.043	0.025	0.014	0.012
525732	10	6	8	8	0.080	0.029	0.017	0.023	0.024	0.012	0.006	0.008
525733	62	160	308	286	0.496	0.773	0.658	0.806	0.045	0.029	0.022	0.021
525805	-	9	45	42	-	0.043	0.096	0.118	-	0.014	0.014	0.017
535803	8	-	-	-	0.064	-	-	-	0.022	-	-	-
515801	-	-	12	-	-	-	0.026	-	-	-	0.007	-
515802	-	-	38	-	-	-	0.081	-	-	-	0.013	-
525807	-	-	6	-	-	-	0.013	-	-	-	0.005	-
535734	-	-	4	-	-	-	0.009	-	-	-	0.004	-
Total	125	207	468	355								
Private:												
525731	51	28	159	162	0.121	0.027	0.145	0.167	0.016	0.005	0.011	0.012
525732	15	125	53	28	0.036	0.122	0.048	0.029	0.009	0.010	0.006	0.005
525733	346	863	858	740	0.822	0.839	0.784	0.764	0.019	0.011	0.012	0.014
525805	-	12	20	38	-	0.012	0.018	0.039	-	0.003	0.004	0.006
535731	2	-	-	-	0.005	-	-	-	0.003	-	-	-
535803	7	-	4	-	0.017	-	0.004	-	0.006	-	0.002	-
Total	421	1,028	1,094	968								

Distribution of Rockfish Harvest:

Stat Area	Number of Rockfish Kept				Proportion of Harvest (p)				SE (p)			
	1992	1993	1994	1995	1992	1993	1994	1995	1992	1993	1994	1995
Charter:												
525731	20	-	15	13	0.476	-	0.071	0.092	0.078	-	0.018	0.016
525732	10	-	16	7	0.238	-	0.076	0.049	0.067	-	0.018	0.012
525733	6	101	178	116	0.143	0.821	0.844	0.817	0.055	0.035	0.025	0.022
525805	-	22	2	6	-	0.179	0.009	0.042	-	0.035	0.007	0.011
535803	6	-	-	-	0.143	-	-	-	0.055	-	-	-
Total	42	123	211	142								
Private:												
525731	56	16	8	14	0.344	0.061	0.036	0.077	0.037	0.029	0.013	0.015
525732		30	26	32		0.114	0.117	0.176		0.039	0.022	0.021
525733	95	197	188	122	0.583	0.746	0.847	0.670	0.039	0.053	0.024	0.026
525805		21		14		0.080		0.077		0.033		0.015
535803	12				0.074				0.021			
Total	163	264	222	182								

Note: A dash (-) indicates a value of 0.

Appendix B11.-Effort for bottomfish and harvest of rockfish by user group and ADF&G statistical area for anglers interviewed at Homer, 1992-1995.

Distribution of Bottomfish Effort:

Stat Area	Number of Angler-Days				Proportion of Angler -Days (p)				SE (p)			
	1992	1993	1994	1995	1992	1993	1994	1995	1992	1993	1994	1995
Charter:												
A	171	-	-	-	0.040	-	-	-	0.003	-	-	-
B	1,890	-	-	-	0.444	-	-	-	0.008	-	-	-
C	464	-	-	-	0.109	-	-	-	0.005	-	-	-
D	1,732	-	-	-	0.407	-	-	-	0.008	-	-	-
515903	-	13	25	7	-	0.011	0.011	0.005	-	0.003	0.002	0.002
515904	-	77	42	13	-	0.063	0.019	0.010	-	0.007	0.003	0.003
515905	-	280	342	194	-	0.229	0.152	0.145	-	0.012	0.008	0.010
515906	-	-	43	100	-	-	0.019	0.075	-	-	0.003	0.007
515907	-	48	55	56	-	0.039	0.024	0.042	-	0.006	0.003	0.005
515931	-	13	27	8	-	0.011	0.012	0.006	-	0.003	0.002	0.002
515933	-	-	3	-	-	-	0.001	-	-	-	0.001	-
515935	-	-	3	4	-	-	0.001	0.003	-	-	0.001	0.001
515936	-	50	51	43	-	0.041	0.023	0.032	-	0.006	0.003	0.005
515937	-	36	76	63	-	0.029	0.034	0.047	-	0.005	0.004	0.006
515939	-	4	-	-	-	0.003	-	-	-	0.002	-	-
525836	-	97	178	91	-	0.079	0.079	0.068	-	0.008	0.006	0.007
525837	-	7	-	-	-	0.006	-	-	-	0.002	-	-
525901	-	25	30	63	-	0.020	0.013	0.047	-	0.004	0.002	0.006
525902	-	394	641	384	-	0.323	0.284	0.287	-	0.013	0.010	0.012
525931	-	169	673	303	-	0.138	0.299	0.226	-	0.010	0.010	0.011
525932	-	8	10	-	-	0.007	0.004	-	-	0.002	0.001	-
515831	-	-	55	-	-	-	0.024	-	-	-	0.003	-
515901	-	-	-	11	-	-	-	0.008	-	-	-	0.002
Total	4,257	1,221	2,254	1,340								
Private												
A	111	-	-	-	0.072	-	-	-	0.007	-	-	-
B	682	-	-	-	0.441	-	-	-	0.013	-	-	-
C	529	-	-	-	0.342	-	-	-	0.012	-	-	-
D	224	-	-	-	0.145	-	-	-	0.009	-	-	-
515905	-	-	-	3	-	-	-	0.007	-	-	-	0.004
515906	-	8	-	2	-	0.014	-	0.005	-	0.005	-	0.003
515907	-	87	43	44	-	0.155	0.058	0.107	-	0.015	0.009	0.015
515908	-	27	37	29	-	0.048	0.050	0.071	-	0.009	0.008	0.013
515931	-	2	6	8	-	0.004	0.008	0.019	-	0.003	0.003	0.007
515932	-	23	31	26	-	0.041	0.042	0.063	-	0.008	0.007	0.012
515933	-	25	44	47	-	0.045	0.060	0.114	-	0.009	0.009	0.016
515934	-	4	4	7	-	0.007	0.005	0.017	-	0.004	0.003	0.006
515935	-	38	81	39	-	0.068	0.110	0.095	-	0.011	0.012	0.014
515936	-	51	121	78	-	0.091	0.164	0.190	-	0.012	0.014	0.019
515937	-	60	85	34	-	0.107	0.115	0.083	-	0.013	0.012	0.014
515938	-	6	4	3	-	0.011	0.005	0.007	-	0.004	0.003	0.004
515939	-	11	-	4	-	0.020	-	0.010	-	0.006	-	0.005
525901	-	15	11	5	-	0.027	0.015	0.012	-	0.007	0.004	0.005
525902	-	84	64	33	-	0.150	0.087	0.080	-	0.015	0.010	0.013
525931	-	118	201	40	-	0.210	0.272	0.097	-	0.017	0.016	0.015
525932	-	2	2	-	-	0.004	0.003	-	-	0.003	0.002	-

-continued-

Appendix B11.-Page 2 of 2.

Distribution of Bottomfish Effort (continued):

Stat Area	Number of Angler-Days				Proportion of Angler -Days (p)				SE (p)			
	1992	1993	1994	1995	1992	1993	1994	1995	1992	1993	1994	1995
526002	-	-	4	-	-	-	0.005	-	-	-	0.003	-
515901	-	-	-	5	-	-	-	0.012	-	-	-	0.005
516001	-	-	-	4	-	-	-	0.010	-	-	-	0.005
	1,546	561	738	411								

Distribution of Rockfish Harvest:

Stat Area	Number of Rockfish Kept				Proportion of Harvest (p)				SE (p)			
	1992	1993	1994	1995	1992	1993	1994	1995	1992	1993	1994	1995
Charter:												
515831	-	-	31	-	-	-	0.211	-	-	-	0.034	-
515903	-	0	50	0	-	0.000	0.340	0.000	-	0.000	0.039	0.000
515904	-	2	1	0	-	0.035	0.007	0.000	-	0.025	0.007	0.000
515905	-	43	37	16	-	0.754	0.252	0.271	-	0.058	0.036	0.058
515906	-	0	19	15	-	0.000	0.129	0.254	-	0.000	0.028	0.057
515907	-	0	0	15	-	0.000	0.000	0.254	-	0.000	0.000	0.057
515935	-	0	2	0	-	0.000	0.014	0.000	-	0.000	0.010	0.000
515936	-	9	0	10	-	0.158	0.000	0.169	-	0.049	0.000	0.049
525836	-	1	2	2	-	0.018	0.014	0.034	-	0.018	0.010	0.024
525901	-	2	0	0	-	0.035	0.000	0.000	-	0.025	0.000	0.000
525902	-	0	5	1	-	0.000	0.034	0.017	-	0.000	0.015	0.017
Total	0	57	147	59								
Private:												
515908	-	4	0	-	-	-	-	-	-	-	-	-
515936	-	2	1	-	-	-	-	-	-	-	-	-
525902	-	5	0	-	-	-	-	-	-	-	-	-
	0	11	1	0								

Note: A dash (-) indicates a value of 0.

Appendix B12.-Effort for bottomfish and harvest of rockfish by ADF&G statistical area as recorded in voluntary Seward Military Resort logbooks, 1992-1995. Army and Air Force vessel data are combined in these tables.

Distribution of Bottomfish Effort:

Stat Area	Number of Angler-Days				Proportion of Angler -Days (p)				SE (p)			
	1992	1993	1994	1995	1992	1993	1994	1995	1992	1993	1994	1995
475933	-	-	-	41	-	-	-	0.005	-	-	-	0.001
475934	-	-	-	60	-	-	-	0.008	-	-	-	0.001
485931	34	20	143	-	0.005	0.003	0.018	-	0.001	0.001	0.001	-
485932	-	68	107	521	-	0.009	0.013	0.069	-	0.001	0.001	0.003
485933	35	115	14	87	0.005	0.016	0.002	0.011	0.001	0.001	0.000	0.001
485935	434	1,743	964	806	0.063	0.239	0.118	0.106	0.003	0.005	0.004	0.004
486001	-	-	45	25	-	-	0.006	0.003	-	-	0.001	0.001
495902	115	10	146	80	0.017	0.001	0.018	0.011	0.002	0.000	0.001	0.001
495932	3,974	4,091	4,402	3,942	0.578	0.561	0.540	0.521	0.006	0.006	0.006	0.006
495933	-	-	23	-	-	-	0.003	-	-	-	0.001	-
495934	667	368	182	170	0.097	0.051	0.022	0.022	0.004	0.003	0.002	0.002
495935	-	8	-	-	-	0.001	-	-	-	0.000	-	-
495936	75	47	80	65	0.011	0.006	0.010	0.009	0.001	0.001	0.001	0.001
495937	-	14	-	-	-	0.002	-	-	-	0.001	-	-
495938	583	643	1259	767	0.085	0.088	0.155	0.101	0.003	0.003	0.004	0.003
495939	-	-	-	15	-	-	-	0.002	-	-	-	0.001
496001	5	98	11	-	0.001	0.013	0.001	-	0.000	0.001	0.000	-
496002	54	61	49	99	0.008	0.008	0.006	0.013	0.001	0.001	0.001	0.001
505906	-	-	-	16	-	-	-	0.002	-	-	-	0.001
505932	896	-	722	878	0.130	-	0.089	0.116	0.004	-	0.003	0.004
	6,872	7,286	8,147	7,572								

Distribution of Rockfish Harvest:

Stat Area	Number of Rockfish Kept				Proportion of Harvest (p)				SE (p)			
	1992	1993	1994	1995	1992	1993	1994	1995	1992	1993	1994	1995
475934	-	-	-	4	-	-	-	0.000	-	-	-	0.000
485931	16	2	69	-	0.001	0.000	0.006	-	0.000	0.000	0.001	-
485932	-	101	214	593	-	0.008	0.019	0.072	-	0.001	0.001	0.003
485933	5	215	16	31	0.000	0.018	0.001	0.004	0.000	0.001	0.000	0.001
485935	635	2,615	1,519	229	0.054	0.216	0.133	0.028	0.002	0.004	0.003	0.002
486001	-	-	50	0	-	-	0.004	0.000	-	-	0.001	0.000
495902	301	49	209	135	0.026	0.004	0.018	0.016	0.001	0.001	0.001	0.001
495932	7,889	7,860	7,085	6,371	0.670	0.651	0.620	0.772	0.004	0.004	0.005	0.005
495934	1,215	519	195	111	0.103	0.043	0.017	0.013	0.003	0.002	0.001	0.001
495935	-	10	-	-	-	0.001	-	-	-	0.000	-	-
495936	51	17	131	9	0.004	0.001	0.011	0.001	0.001	0.000	0.001	0.000
495937	-	50	-	-	-	0.004	-	-	-	0.001	-	-
495938	791	394	1,175	344	0.067	0.033	0.103	0.042	0.002	0.002	0.003	0.002
495939	-	-	-	28	-	-	-	0.003	-	-	-	0.001
496001	1	235	7	-	0.000	0.019	0.001	-	0.000	0.001	0.000	-
496002	10	13	40	18	0.001	0.001	0.004	0.002	0.000	0.000	0.001	0.001
505906	-	-	-	2	-	-	-	0.000	-	-	-	0.000
505932	853	-	715	376	0.072	-	0.063	0.046	0.002	-	0.002	0.002
	11,767	12,080	11,425	8,251								

Note: A dash (-) indicates a value of 0.

Appendix B13.-Effort for bottomfish and harvest of rockfish by user group and ADF&G statistical area for anglers interviewed at Seward, 1992-1995.

Distribution of Bottomfish Effort:

Stat Area	Number of Angler-Days				Proportion of Angler -Days (p)				SE (p)			
	1992	1993	1994	1995	1992	1993	1994	1995	1992	1993	1994	1995
Charter:												
475932	-	-	34	-	-	-	0.034	-	-	-	0.006	-
475933	-	-	78	385	-	-	0.077	0.310	-	-	0.008	0.013
475934	-	71	99	75	-	0.110	0.098	0.060	-	0.012	0.009	0.007
485931	-	16	107	175	-	0.025	0.106	0.141	-	0.006	0.010	0.010
485932	83	29	136	130	0.089	0.045	0.134	0.105	0.009	0.008	0.011	0.009
485933	64	99	13	19	0.069	0.153	0.013	0.015	0.008	0.014	0.004	0.003
485934	10	12	-	-	0.011	0.019	-	-	0.003	0.005	-	-
485935	372	202	176	60	0.400	0.313	0.174	0.048	0.016	0.018	0.012	0.006
486001	-	-	12	26	-	-	0.012	0.021	-	-	0.003	0.004
495902	14	-	-	-	0.015	-	-	-	0.004	-	-	-
495931	38	-	6	-	0.041	-	0.006	-	0.007	-	0.002	-
495932	74	41	144	101	0.080	0.064	0.142	0.081	0.009	0.010	0.011	0.008
495933	-	-	-	6	-	-	-	0.005	-	-	-	0.002
495934	3	17	9	5	0.003	0.026	0.009	0.004	0.002	0.006	0.003	0.002
495935	20	-	-	36	0.022	-	-	0.029	0.005	-	-	0.005
495936	-	-	9	-	-	-	0.009	-	-	-	0.003	-
495938	158	93	136	153	0.170	0.144	0.134	0.123	0.012	0.014	0.011	0.009
495939	4	28	19	-	0.004	0.043	0.019	-	0.002	0.008	0.004	-
496002	-	-	-	5	-	-	-	0.004	-	-	-	0.002
505908	12	-	-	-	0.013	-	-	-	0.004	-	-	-
505909	15	-	29	-	0.016	-	0.029	-	0.004	-	0.005	-
505932	62	37	5	66	0.067	0.057	0.005	0.053	0.008	0.009	0.002	0.006
Total	929	645	1,012	1,242								
Private:												
475933	-	-	8	1	-	-	0.009	0.002	-	-	0.003	0.002
475934	-	4	3	14	-	0.005	0.003	0.027	-	0.003	0.002	0.007
485931	-	5	6	-	-	0.007	0.007	-	-	0.003	0.003	-
485932	4	3	11	1	0.008	0.004	0.012	0.002	0.004	0.002	0.004	0.002
485933	24	75	76	9	0.045	0.099	0.086	0.017	0.009	0.011	0.009	0.006
485934	-	-	2	-	-	-	0.002	-	-	-	0.002	-
485935	58	116	148	50	0.109	0.153	0.167	0.096	0.014	0.013	0.013	0.013
495902	-	-	2	-	-	-	0.002	-	-	-	0.002	-
495931	4	6	6	-	0.008	0.008	0.007	-	0.004	0.003	0.003	-
495932	123	149	143	105	0.232	0.196	0.162	0.202	0.018	0.014	0.012	0.018
495933	-	-	3	6	-	-	0.003	0.012	-	-	0.002	0.005
495934	-	10	3	-	-	0.013	0.003	-	-	0.004	0.002	-
495935	-	4	-	2	-	0.005	-	0.004	-	0.003	-	0.003
495936	1	4	3	-	0.002	0.005	0.003	-	0.002	0.003	0.002	-
495937	-	-	8	-	-	-	0.009	-	-	-	0.003	-
495938	303	344	420	243	0.572	0.453	0.475	0.466	0.022	0.018	0.017	0.022
495939	3	4	-	-	0.006	0.005	-	-	0.003	0.003	-	-
496001	5	-	5	-	0.009	-	0.006	-	0.004	-	0.003	-
496002	5	27	37	84	0.009	0.036	0.042	0.161	0.004	0.007	0.007	0.016
505932	-	9	-	6	-	0.012	-	0.012	-	0.004	-	0.005
Total	530	760	884	521								

-continued-

Appendix B13.-Page 2 of 2.

Distribution of Rockfish Harvest:

Stat Area	Number of Rockfish Kept				Proportion of Harvest (p)				SE (p)			
	1992	1993	1994	1995	1992	1993	1994	1995	1992	1993	1994	1995
Charter:												
475932	-	10	-	-	-	0.010	-	-	-	0.003	-	-
475933	-	37	101	-	-	0.038	0.128	-	-	0.006	0.012	-
475934	8	169	34	-	0.014	0.172	0.043	-	0.005	0.012	0.007	-
485931	1	69	49	-	0.002	0.070	0.062	-	0.002	0.008	0.009	-
485932	10	115	84	-	0.018	0.117	0.106	-	0.006	0.010	0.011	-
485933	238	25	20	-	0.431	0.025	0.025	-	0.021	0.005	0.006	-
485934	-	1	-	-	-	0.001	-	-	-	0.001	-	-
485935	125	209	81	-	0.226	0.213	0.102	-	0.018	0.013	0.011	-
486001	-	30	37	-	-	0.031	0.047	-	-	0.006	0.008	-
495902	-	35	-	-	-	0.036	-	-	-	0.006	-	-
495931	-	4	-	-	-	0.004	-	-	-	0.002	-	-
495932	65	147	106	-	0.118	0.150	0.134	-	0.014	0.011	0.012	-
495934	2	3	-	-	0.004	0.003	-	-	0.003	0.002	-	-
495935	-	-	31	-	-	0.000	0.039	-	-	0.000	0.007	-
495936	-	12	-	-	-	0.012	-	-	-	0.004	-	-
495938	77	73	136	-	0.139	0.074	0.172	-	0.015	0.008	0.013	-
495939	-	3	-	-	-	0.003	-	-	-	0.002	-	-
505909	-	39	-	-	0.000	0.040	-	-	0.000	0.006	-	-
505932	26	0	113	-	0.047	0.000	0.143	-	0.009	0.000	0.012	-
Total	552	981	792	-	-	-	-	-	-	-	-	-
Private:												
485931	2	3	-	-	0.003	0.006	-	-	0.002	0.004	-	-
485932	14	-	-	-	0.022	-	-	-	0.006	-	-	-
485933	47	18	1	-	0.072	0.037	0.005	-	0.010	0.009	0.005	-
485935	60	100	28	-	0.092	0.206	0.147	-	0.011	0.018	0.026	-
495902	-	1	-	-	-	0.002	-	-	-	0.002	-	-
495932	255	176	53	-	0.392	0.362	0.279	-	0.019	0.022	0.033	-
495933	-	4	-	-	-	0.008	-	-	-	0.004	-	-
495935	5	-	-	-	0.008	-	-	-	0.003	-	-	-
495936	-	3	-	-	-	0.006	-	-	-	0.004	-	-
495937	-	2	-	-	-	0.004	-	-	-	0.003	-	-
495938	253	178	104	-	0.389	0.366	0.547	-	0.019	0.022	0.036	-
496002	9	1	4	-	0.014	0.002	0.021	-	0.005	0.002	0.010	-
505932	5	0	-	-	0.008	0.000	-	-	0.003	0.000	-	-
Total	650	486	190	-	-	-	-	-	-	-	-	-

Note: A dash (-) indicates a value of 0.

Appendix B14.-Effort for bottomfish and harvest of rockfish by user group and ADF&G statistical area for anglers interviewed at Valdez, 1992-1995.

Distribution of Bottomfish Effort:

Stat Area	Number of Angler-Days				Proportion of Angler -Days (p)				SE (p)			
	1992	1993	1994	1995	1992	1993	1994	1995	1992	1993	1994	1995
Charter:												
466001	6	41	-	-	0.011	0.036	-	-	0.004	0.006	-	-
466002	180	118	70	134	0.331	0.105	0.053	0.135	0.020	0.009	0.006	0.011
466003	88	152	187	82	0.162	0.135	0.142	0.082	0.016	0.010	0.010	0.009
466004	30	128	191	162	0.055	0.114	0.145	0.163	0.010	0.009	0.010	0.012
466005	60	87	64	67	0.110	0.077	0.048	0.067	0.013	0.008	0.006	0.008
466031	34	48	14	9	0.063	0.043	0.011	0.009	0.010	0.006	0.003	0.003
466032	-	72	58	75	-	0.064	0.044	0.075	-	0.007	0.006	0.008
466033	36	97	171	85	0.066	0.086	0.130	0.086	0.011	0.008	0.009	0.009
466100	-	35	35	47	-	0.031	0.027	0.047	-	0.005	0.004	0.007
475932	-	-	-	12	-	-	-	0.012	-	-	-	0.003
476001	7	6	-	-	0.013	0.005	-	-	0.005	0.002	-	-
476002	23	44	38	18	0.042	0.039	0.029	0.018	0.009	0.006	0.005	0.004
476003	6	21	106	30	0.011	0.019	0.080	0.030	0.004	0.004	0.007	0.005
476005	-	-	18	-	-	-	0.014	-	-	-	0.003	-
476007	6	41	78	87	0.011	0.036	0.059	0.088	0.004	0.006	0.006	0.009
476008	6	97	117	4	0.011	0.086	0.089	0.004	0.004	0.008	0.008	0.002
476009	-	5	12	40	-	0.004	0.009	0.040	-	0.002	0.003	0.006
476031	-	38	28	4	-	0.034	0.021	0.004	-	0.005	0.004	0.002
476032	18	22	20	72	0.033	0.020	0.015	0.072	0.008	0.004	0.003	0.008
476033	14	4	17	10	0.026	0.004	0.013	0.010	0.007	0.002	0.003	0.003
476034	26	36	49	42	0.048	0.032	0.037	0.042	0.009	0.005	0.005	0.006
476035	-	33	37	9	-	0.029	0.028	0.009	-	0.005	0.005	0.003
476036	3	-	10	5	0.006	-	0.008	0.005	0.003	-	0.002	0.002
Total	543	1,125	1,320	994								
Private												
466001	-	10	8	-	-	0.020	0.012	-	-	0.006	0.004	-
466002	-	-	14	9	-	-	0.021	0.021	-	-	0.006	0.007
466003	14	20	15	46	0.101	0.040	0.023	0.105	0.026	0.009	0.006	0.015
466004	-	-	23	28	-	-	0.035	0.064	-	-	0.007	0.012
466005	-	5	23	-	-	0.010	0.035	-	-	0.004	0.007	-
466031	11	14	7	24	0.079	0.028	0.011	0.055	0.023	0.007	0.004	0.011
466032	6	100	118	57	0.043	0.199	0.181	0.130	0.017	0.018	0.015	0.016
466033	59	158	232	156	0.424	0.314	0.355	0.356	0.042	0.021	0.019	0.023
466100	21	157	89	68	0.151	0.312	0.136	0.155	0.030	0.021	0.013	0.017
476002	-	-	2	5	-	-	0.003	0.011	-	-	0.002	0.005
476003	-	-	-	4	-	-	-	0.009	-	-	-	0.005
476005	-	-	3	-	-	-	0.005	-	-	-	0.003	-
476007	-	4	4	-	-	0.008	0.006	-	-	0.004	0.003	-
476008	-	2	26	4	-	0.004	0.040	0.009	-	0.003	0.008	0.005
476009	-	-	8	-	-	-	0.012	-	-	-	0.004	-
476031	-	2	-	4	-	0.004	-	0.009	-	0.003	-	0.005
476032	-	8	14	-	-	0.016	0.021	-	-	0.006	0.006	-
476033	-	3	3	3	-	0.006	0.005	0.007	-	0.003	0.003	0.004
476034	3	2	23	9	0.022	0.004	0.035	0.021	0.012	0.003	0.007	0.007
476035	25	16	37	18	0.180	0.032	0.057	0.041	0.033	0.008	0.009	0.009

-continued-

Appendix B14.-Page 2 of 2.

Distribution of Bottomfish Effort (continued):

Stat Area	Number of Angler-Days				Proportion of Angler -Days (p)				SE (p)			
	1992	1993	1994	1995	1992	1993	1994	1995	1992	1993	1994	1995
476036	-	-	4	3	-	-	0.006	0.007	-	-	0.003	0.004
486002	-	2	-	-	-	0.004	-	-	-	0.003	-	-
Total	139	503	653	438								

Distribution of Rockfish Harvest:

Stat Area	Number of Rockfish Kept				Proportion of Harvest (p)				SE (p)			
	1992	1993	1994	1995	1992	1993	1994	1995	1992	1993	1994	1995
Charter:												
466002		117	9	24	0.241	0.023	0.065		0.019	0.007	0.013	
466003		35	37	15	0.072	0.093	0.040		0.012	0.015	0.010	
466004		30	76	119	0.062	0.191	0.320		0.011	0.020	0.024	
466005		31	10	28	0.064	0.025	0.075		0.011	0.008	0.014	
466031		6	2	-	0.012	0.005	-		0.005	0.004	-	
466032		14	2	5	0.029	0.005	0.013		0.008	0.004	0.006	
466033		48	57	10	0.099	0.143	0.027		0.014	0.018	0.008	
466100		11	16	31	0.023	0.040	0.083		0.007	0.010	0.014	
475932		-	-	1	-	-	0.003		-	-	0.003	
476001		13	-	-	0.027	-	-		0.007	-	-	
476002		31	38	20	0.064	0.095	0.054		0.011	0.015	0.012	
476003		10	45	14	0.021	0.113	0.038		0.006	0.016	0.010	
476005		-	2	-	-	0.005	-		-	0.004	-	
476007		96	44	53	0.198	0.111	0.142		0.018	0.016	0.018	
476008		8	4	-	0.016	0.010	-		0.006	0.005	-	
476009		-	-	25	-	-	0.067		-	-	0.013	
476031		6	11	2	0.012	0.028	0.005		0.005	0.008	0.004	
476032		3	-	16	0.006	-	0.043		0.004	-	0.011	
476033		1	2	-	0.002	0.005	-		0.002	0.004	-	
476034		5	37	9	0.010	0.093	0.024		0.005	0.015	0.008	
476035		20	4	-	0.041	0.010	-		0.009	0.005	-	
476036		-	2	-	-	0.005	-		-	0.004	-	
Total		485	398	372								
Private												
466001		9	-	-	0.062	-	-		0.020	-	-	
466002		-	1	3	-	0.007	0.037		-	0.007	0.021	
466003		-	-	4	-	-	0.049		-	-	0.024	
466004		-	20	5	-	0.134	0.062		-	0.028	0.027	
466005		1	-	-	0.007	-	-		0.007	-	-	
466031		4	-	1	0.027	-	0.012		0.014	-	0.012	
466032		16	7	5	0.110	0.047	0.062		0.026	0.017	0.027	
466033		76	58	36	0.521	0.389	0.444		0.041	0.040	0.056	
466100		32	28	10	0.219	0.188	0.123		0.034	0.032	0.037	
476002		-	6	8	-	0.040	0.099		-	0.016	0.033	
476003		-	-	1	-	-	0.012		-	-	0.012	
476007		2	1	-	0.014	0.007	-		0.010	0.007	-	
476008		1	4	-	0.007	0.027	-		0.007	0.013	-	
476032		5	4	6	0.034	0.027	0.074		0.015	0.013	0.029	
476033		-	-	1	-	-	0.012		-	-	0.012	
476034		-	11	1	-	0.074	0.012		-	0.021	0.012	
476035		-	9	-	-	0.060	-		-	0.020	-	
Total		146	149	81								

Note: A dash (-) indicates a value of 0.

Appendix B15.-Sample size (n) and estimated mean weight and harvest biomass for selected Southcentral Alaska recreational rockfish fisheries, 1991-1995.

Port	Year	Species	n	Mean Weight (kg)	SE (Mean Weight)	Harvest Biomass (kg)	SE (Biomass)
Homer	1991	Black	137	2.05	0.05	1,918	342
Homer	1991	Canary	1	0.65		4	
Homer	1991	China	3	1.04	0.07	21	13
Homer	1991	Dusky	28	0.95	0.05	182	45
Homer	1991	Quillback	1	1.21		8	
Homer	1991	Tiger	4	1.31	0.32	36	20
Homer	1991	Unspecified	1				
Homer	1991	Yelloweye	237	4.02	0.10	6,513	1,106
Homer	1992	Black	247	1.85	0.04	2,409	322
Homer	1992	Canary	20	1.41	0.04	148	37
Homer	1992	China	8	0.85	0.05	36	13
Homer	1992	Copper	1	1.35		7	
Homer	1992	Dusky	311	1.01	0.02	1,651	216
Homer	1992	Quillback	5	1.04	0.09	28	13
Homer	1992	Rougheye	2	0.83	0.01	9	6
Homer	1992	Shortraker	3	0.91	0.12	14	9
Homer	1992	Tiger	2	1.33	0.12	14	10
Homer	1992	Widow	2	2.17	0.03	23	16
Homer	1992	Yelloweye	259	3.67	0.09	5,009	667
Homer	1993	Black	184	2.13	0.03	3,666	557
Homer	1993	Canary	2	1.30	0.05	24	17
Homer	1993	China	2	0.88	0.04	16	12
Homer	1993	Copper	2	1.55	0.01	29	21
Homer	1993	Dusky	103	1.23	0.04	1,180	198
Homer	1993	Rougheye	4	1.11	0.40	41	25
Homer	1993	Tiger	3	1.22	0.22	34	21
Homer	1993	Yelloweye	234	4.41	0.10	9,643	1,439
Homer	1994	Black	146	2.14	0.04	4,016	535
Homer	1994	Canary	3	1.28	0.15	49	29
Homer	1994	Dusky	94	1.04	0.03	1,258	186
Homer	1994	Shortraker	1	0.76		10	
Homer	1994	Tiger	4	1.14	0.16	59	31
Homer	1994	Yelloweye	155	3.68	0.12	7,347	989
Homer	1995	Black	67	2.23	0.04	4,155	688
Homer	1995	Bocaccio	1	0.85		24	
Homer	1995	Canary	2	2.03	0.08	113	80
Homer	1995	China	1	0.97		27	
Homer	1995	Dusky	30	1.13	0.07	941	207
Homer	1995	Yelloweye	55	4.60	0.20	7,046	1,263
Homer	1995	Yellowtail	2	2.00	0.29	111	80
Kodiak	1992	Black	294	1.76	0.03	7,061	1,197
Kodiak	1992	Dusky	115	1.29	0.05	2,028	379
Kodiak	1992	Yelloweye	5	3.98	0.40	272	130
Kodiak	1993	Black	867	1.68	0.01	10,440	1,880
Kodiak	1993	Dusky	174	1.40	0.03	1,751	338
Kodiak	1993	Unspec. Demersal	3	1.69	0.06	37	22
Kodiak	1993	Yelloweye	8	4.02	0.25	231	91
Kodiak	1993	Yellowtail	1	1.60		12	
Kodiak	1994	Black	366	1.86	0.02	6,731	979
Kodiak	1994	Dusky	136	1.44	0.03	1,939	313
Kodiak	1994	Yelloweye	6	3.11	0.52	185	83

-continued-

Appendix B15.-Page 2 of 4.

Port	Year	Species	n	Mean Weight (kg)	SE (Mean Weight)	Harvest Biomass (kg)	SE (Biomass)
Kodiak	1995	Black	313	1.70	0.03	5,236	898
Kodiak	1995	Dusky	100	1.26	0.04	1,241	238
Kodiak	1995	Tiger	1	2.15		21	
Kodiak	1995	Yelloweye	17	5.57	0.61	933	287
Seward	1991	Black	1,126	1.92	0.02	25,877	2,467
Seward	1991	Bocaccio	18	1.16	0.11	249	67
Seward	1991	Canary	9	1.50	0.21	144	55
Seward	1991	China	9	0.63	0.04	68	24
Seward	1991	Copper	1	0.40		5	
Seward	1991	Dusky	22	1.23	0.07	325	77
Seward	1991	Pacific Ocean Perch	2	1.08	0.18	26	19
Seward	1991	Quillback	55	1.37	0.03	903	148
Seward	1991	Rosethorn	2	1.28	0.02	31	22
Seward	1991	Rougheye	4	2.42	0.58	116	63
Seward	1991	Silvergray	7	1.24	0.25	104	44
Seward	1991	Tiger	13	1.14	0.10	177	54
Seward	1991	Yelloweye	384	3.59	0.08	16,493	1,744
Seward	1991	Yellowtail	4	1.69	0.19	81	42
Seward	1992	Black	1,783	1.72	0.01	37,782	2,723
Seward	1992	Bocaccio	5	1.88	1.16	69	53
Seward	1992	Canary	31	1.39	0.11	275	74
Seward	1992	China	35	0.71	0.03	114	33
Seward	1992	Copper	20	1.09	0.08	67	31
Seward	1992	Dusky	47	1.13	0.04	545	97
Seward	1992	Quillback	79	1.23	0.03	831	127
Seward	1992	Rosethorn	2	1.12	0.60	14	14
Seward	1992	Rougheye	7	1.68	0.24	124	54
Seward	1992	Redstripe	3	0.71	0.09	9	9
Seward	1992	Silvergray	53	1.32	0.10	422	92
Seward	1992	Tiger	23	1.08	0.05	120	41
Seward	1992	Yelloweye	362	3.64	0.08	16,187	1,429
Seward	1992	Yellowtail	25	1.44	0.09	231	67
Seward	1993	Black	684	1.81	0.02	32,595	2,829
Seward	1993	Bocaccio	5	0.86	0.20	23	23
Seward	1993	Canary	31	1.46	0.04	425	132
Seward	1993	China	32	0.77	0.03	183	63
Seward	1993	Copper	13	0.91	0.07	96	49
Seward	1993	Dusky	136	1.08	0.02	1,654	254
Seward	1993	Quillback	66	1.19	0.02	569	141
Seward	1993	Rosethorn	1	0.63			
Seward	1993	Rougheye	1	0.78			
Seward	1993	Redstripe	2	1.04	0.20		
Seward	1993	Silvergray	34	1.58	0.14	545	163
Seward	1993	Tiger	16	1.08	0.07	143	65
Seward	1993	Yelloweye	230	3.21	0.08	11,914	1,391
Seward	1993	Yellowtail	21	1.55	0.10	164	83

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Appendix B15.-Page 3 of 4.

Port	Year	Species	n	Mean Weight (kg)	SE (Mean Weight)	Harvest Biomass (kg)	SE (Biomass)
Seward	1994	Black	714	1.78	0.02	39,352	2,850
Seward	1994	Bocaccio	1	7.88			
Seward	1994	Canary	12	1.83	0.06	340	140
Seward	1994	China	11	0.73	0.05	135	57
Seward	1994	Copper	8	1.25	0.13	155	79
Seward	1994	Dusky	28	1.31	0.11	977	222
Seward	1994	Quillback	28	1.12	0.03	623	153
Seward	1994	Rosethorn	1	0.76			
Seward	1994	Redstripe	5	0.77	0.15		
Seward	1994	Silvergray	23	1.40	0.14	476	153
Seward	1994	Tiger	14	1.18	0.11	110	64
Seward	1994	Yelloweye	147	3.87	0.14	15,121	1,721
Seward	1994	Yellowtail	4	1.28	0.18		
Seward	1995	Black	608	1.89	0.02	25,189	2,782
Seward	1995	Canary	20	1.90	0.08	167	85
Seward	1995	China	34	0.75	0.03	98	41
Seward	1995	Copper	26	0.98	0.08	171	64
Seward	1995	Dusky	54	1.06	0.03	394	104
Seward	1995	Quillback	96	1.10	0.02	484	119
Seward	1995	Redstripe	2	0.55	0.03		
Seward	1995	Silvergray	44	1.45	0.08	349	112
Seward	1995	Tiger	16	1.01	0.08	22	22
Seward	1995	Yelloweye	325	3.39	0.08	8,386	1,178
Seward	1995	Yellowtail	10	1.59	0.10	140	71
Valdez	1991	Black	315	2.31	0.03	7,360	1,089
Valdez	1991	China	6	0.71	0.08	43	19
Valdez	1991	Copper	79	0.71	0.05	566	107
Valdez	1991	Dusky	25	1.47	0.11	371	93
Valdez	1991	Harlequin	3	0.45	0.03	14	8
Valdez	1991	Quillback	118	1.06	0.04	1,261	212
Valdez	1991	Rougheye	1	0.76		8	
Valdez	1991	Redstripe	2	0.45	0.12	9	7
Valdez	1991	Shortraker	1	2.09		21	
Valdez	1991	Sharpchin	1	0.28		3	
Valdez	1991	Silvergray	8	0.88	0.13	71	28
Valdez	1991	Splitnose	4	0.26	0.06	10	6
Valdez	1991	Yelloweye	300	2.50	0.07	7,602	1,147
Valdez	1992	Black	394	2.52	0.03	15,777	1,856
Valdez	1992	Canary	3	0.76	0.07	36	21
Valdez	1992	Copper	53	0.81	0.06	682	129
Valdez	1992	Dusky	6	1.07	0.18	102	45
Valdez	1992	Quillback	120	1.28	0.04	2,432	346
Valdez	1992	Rougheye	2	0.47	0.01	15	11
Valdez	1992	Silvergray	12	0.75	0.10	144	47
Valdez	1992	Tiger	2	1.21	0.11	39	28
Valdez	1992	Unspec. Slope	1	0.28		4	
Valdez	1992	Yelloweye	381	2.87	0.09	17,370	2,107

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Appendix B15.-Page 4 of 4.

Port	Year	Species	n	Mean Weight (kg)	SE (Mean Weight)	Harvest Biomass (kg)	SE (Biomass)
Valdez	1993	Black	157	2.48	0.05	5,643	859
Valdez	1993	Bocaccio	3	1.69	0.69	74	49
Valdez	1993	China	3	0.75	0.01	33	19
Valdez	1993	Copper	61	0.66	0.02	584	108
Valdez	1993	Dusky	10	1.08	0.23	156	61
Valdez	1993	Northern	1	0.22		3	
Valdez	1993	Quillback	82	1.14	0.04	1,352	233
Valdez	1993	Silvergray	6	1.06	0.09	93	40
Valdez	1993	Tiger	1	0.75		11	
Valdez	1993	Yelloweye	522	3.13	0.07	23,672	3,260
Valdez	1994	Black	105	2.43	0.05	14,856	1,878
Valdez	1994	China	8	0.77	0.02	359	130
Valdez	1994	Copper	5	0.83	0.10	242	112
Valdez	1994	Dusky	1	1.23		72	
Valdez	1994	Quillback	14	1.43	0.13	1,170	340
Valdez	1994	Silvergray	7	1.33	0.11	544	214
Valdez	1994	Yelloweye	124	2.68	0.10	19,380	2,405
Valdez	1995	Black	68	2.58	0.05	13,878	1,916
Valdez	1995	China	1	1.10		87	
Valdez	1995	Copper	10	0.77	0.02	610	197
Valdez	1995	Dusky	3	1.22	0.41	288	185
Valdez	1995	Quillback	18	1.21	0.08	1,715	431
Valdez	1995	Yelloweye	86	3.35	0.14	22,802	2,999

APPENDIX C. LIST OF DATA AND PROGRAM FILES

Appendix C1.-Names and contents of rockfish biological data files, interview data files, and programs used for analysis of data archived with ADF&G, Division of Sport Fish, Anchorage.

File Name	Description	Format
DATA9195.SAS	SAS data input program, reads data from ROCK91.DTA, ROCK92.DTA, ...ROCK95.DTA	SAS
NBYUSER.SAS	Sample size by user group	SAS
MINMAX.SAS	Min and max ages and lengths	SAS
SPCOMP.SAS	Estimation of species composition for all ports except Seward	SAS
SEWARD.SAS	Estimation of species composition for Seward	SAS
ALSCOMP.SAS	Age, length, and sex composition for all ports but Seward	SAS
SEWALS-U.SAS	Age, length, and sex composition for Seward	SAS
SWHS.TXT	Statewide sport fish survey estimates of harvest and associated SEs	SAS
RFREG.SAS	Length-weight regressions for rockfish	SAS
BIOMASS.SAS	Estimation of harvest biomass	SAS
KODINT92.XLS KODINT93.XLS KINT94.XLS Q7540MA5.XLS	Kodiak interview data, 1992-1995	Excel 97
HOMINT92.XLS HOMINT93.XLS HINT94.XLS 10030MA5.XLS	Homer interview data, 1992-1995	Excel 97
SEWINT92.XLS SEWINT93.XLS SINT94.XLS 10020MA5.XLS	Seward interview data, 1992-1995	Excel 97
SEWMIL92.XLS SEWMIL93.XLS SEWMIL94.XLS SEWMIL95.XLS	Seward military logbook data, 1992-1995	Excel 97
VALINT92.XLS VALINT93.XLS VINT94.XLS J0010MA5.XLS	Kodiak interview data, 1992-1995	Excel 97
ROCK91.DTA	1991 rockfish data files:	AWL ^a
10030BD1.DTA	Homer yelloweye	AWL
10030BE1.DTA	Homer black	AWL
10030BF1.DTA	Homer misc. species	AWL
10020BE1.DTA	Seward yelloweye	AWL
10020BF1.DTA	Seward quillback	AWL
10020BG1.DTA	Seward black	AWL
10020BH1.DTA	Seward misc. species	AWL

-continued-

Appendix C1.-Page 2 of 3.

File Name	Description	Format
J0010BB1.DTA	Valdez yelloweye	AWL ^a
J0010BI1.DTA	Valdez yelloweye	AWL
J0010BC1.DTA	Valdez black	AWL
J0010BH1.DTA	Valdez black	AWL
J0010BJ1.DTA	Valdez quillback	AWL
J0010BK1.DTA	Valdez copper	AWL
J0010BL1.DTA	Valdez misc. species	AWL
J0020BB1.DTA	Whittier yelloweye	AWL
J0020BC1.DTA	Whittier misc. rockfish and lingcod	AWL
ROCK92.DTA	1992 rockfish data files:	AWL
Q7540BC2.DTA	Kodiak black	AWL
Q7540BD2.DTA	Kodiak yelloweye	AWL
Q7540BE2.DTA	Kodiak dusky	AWL
10030BC2.DTA	Homer dusky	AWL
10030BD2.DTA	Homer black	AWL
10030BE2.DTA	Homer yelloweye	AWL
10030BF2.DTA	Homer misc. species	AWL
10020BD2.DTA	Seward black	AWL
10020BE2.DTA	Seward yelloweye	AWL
10020BF2.DTA	Seward quillback	AWL
10020BG2.DTA	Seward silvergray	AWL
10020BH2.DTA	Seward misc. species	AWL
J0010BC2.DTA	Valdez black	AWL
J0010BD2.DTA	Valdez yelloweye	AWL
J0010BE2.DTA	Valdez quillback	AWL
J0010BF2.DTA	Valdez misc. species	AWL
ROCK93.DTA	1993 rockfish data files:	AWL
Q7540BC3.DTA	Kodiak black	AWL
Q7540BD3.DTA	Kodiak dusky	AWL
Q7540BE3.DTA	Kodiak misc. species	AWL
10030BB3.DTA	Homer yelloweye	AWL
10030BC3.DTA	Homer black	AWL
10030BD3.DTA	Homer dusky	AWL
10030BF3.DTA	Homer misc. species	AWL
10020BC3.DTA	Seward black	AWL
10020BD3.DTA	Seward dusky	AWL
10020BE3.DTA	Seward yelloweye	AWL
10020BF3.DTA	Seward quillback	AWL
10020BG3.DTA	Seward misc. species	AWL
J0010BC3.DTA	Valdez yelloweye	AWL
J0010BD3.DTA	Valdez black	AWL
J0010BE3.DTA	Valdez quillback	AWL
J0010BF3.DTA	Valdez misc. species	AWL
ROCK94.DTA	1994 rockfish data files:	AWL
Q7540BC4.DTA	Kodiak black	AWL
Q7540BD4.DTA	Kodiak dusky	AWL
Q7540BE4.DTA	Kodiak yelloweye	AWL
10030BD4.DTA	Homer yelloweye	AWL
10030BE4.DTA	Homer black	AWL

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Appendix C1.-Page 3 of 3.

File Name	Description	Format
10030BF4.DTA	Homer misc. species	AWL ^a
10020BB4.DTA	Seward black	AWL
10020BC4.DTA	Seward yelloweye	AWL
10020BE4.DTA	Seward misc. species	AWL
J0010BB4.DTA	Valdez yelloweye	AWL
J0010BC4.DTA	Valdez black	AWL
J0010BD4.DTA	Valdez misc. species	AWL
ROCK95.DTA	1995 rockfish data files:	AWL
Q7540BC5.DTA	Kodiak black	AWL
Q7540BD5.DTA	Kodiak dusky	AWL
Q7540BE5.DTA	Kodiak misc. species	AWL
10030BC5.DTA	Homer black	AWL
10030BD5.DTA	Homer yelloweye	AWL
10030BE5.DTA	Homer misc. species	AWL
10020BC5.DTA	Seward black	AWL
10020BD5.DTA	Seward yelloweye	AWL
10020BE5.DTA	Seward misc. species	AWL
J0010BC5.DTA	Valdez black	AWL
J0010BD5.DTA	Valdez yelloweye	AWL
J0010BE5.DTA	Valdez misc. species	AWL

^a Sport Fish Mark Sense Age-Weight-Length Ver. 1.0.